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THE

DENTAL REVIEW

DEVOTED TO THE ADVANCEMENT OF
DENTAL SCIENCE.

EDITOR:
C. N. JOHNSON, L.D.S., D.D.S.

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ORIGINAL COMMUNICATIONS.

A FEW WORDS ON CARVED PORCELAIN CROWNS.*

BY WILLIAM A. SPRING, D. D. S., DRESDEN, GERMANY.

The advent of several kinds of porcelain bodies has materially increased the use of all porcelain band crowns, and for this I think we may as a profession be grateful. Undoubtedly the day for the gold incisor, cuspid or bicuspid crown is rapidly passing away, and already in some practices a third molar is always crowned with porcelain in preference to gold. The advantages, natural appearance and cleanliness, are obvious. I beg briefly to call attention to another advantage, the ease of manipulation and saving of time, which, though not of vital or even prime importance, has a practical value to us all.

The more common method of making an all porcelain crown is to select a facing of suitable color and attach it to the base by soldering or clinching the pins to the dowel, and then adding the porcelain backing. I find it almost as easy, however, to carve and bake the entire crown, and one saves thereby the selection of the facing, grinding, fitting of the same and the soldering of the pins.

The shade must be selected at this time, but size, shape and contour are indicated by the models. The carved crown is stronger because more homogeneous, and is especially advantageous in incisors with a close bite; in fact, I consider an incisor with a close bite quite unsafe if made by the facing method. There is no room for any attachment between pins and dowel, and the amount of porcelain over or back of the end of the dowel is dangerously slight. In the carved crown this stump of the dowel may be placed as far forward as desired, thus securing an equal bulk of porcelain all around it.

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*Read before the American Dental Society of Europe.

The method is simple from start to finish. A cap and dowel is made as for the Richmond crown, the buccal surface being well beveled and the dowel being allowed to protrude two millimeters, which is a little less than one-eighth of an inch. After soldering, the buccal surface should be beveled still more by grinding. I use a medium soft platinum 28 American gauge and a pin pounded out of iridio platinum, gauge 14. Since no facing is to be used, the placing of the dowel so that the protruding end shall be in the thickest part of the porcelain becomes a simple matter. The cap is now placed upon the root and a bite impression taken with a small piece of modeling composition. The inside of the cap and the dowel is then waxed, placed into correct position on the impression and put up into the Bonwill articulator. Before baking it is well to introduce the cap into the furnace to remove any wax that hot water has failed to displace. A Close body crown can be made with two bakes. If the biscuit bake is made to nearly reach the occluding tooth, one may carve to correct articulation, making no allowance for shrinkage on the grinding surface. That surface being carved, the crown is removed from the articulator and the circumference increased to make up for the shrinkage. I shall show at my clinic two specimens of biscuit bake, one of Close body and one of Whiteley special. The first is rough with small shining facets over its surface, the other is smoother and resembles more the biscuit bake of ordinary table porcelain.

This Whiteley special, kindly furnished me by the Dentists' Supply Co. of New York, requires a much higher heat than Close's body, but makes very attractive crowns, and I use it entirely for the six front teeth. It consists of two kinds of powder, body and enamel, which fuse at the same temperature, but both are essential to secure the most beautiful effect. A heat which will fuse Close's body in four minutes will fuse this body in fourteen minutes, but I have been able to secure a heat in the revelation oil furnace which will fuse this body in six minutes. I have found it necessary when using this porcelain to remove it at the second bake before it has come quite to a final fuse, for it often needs a little more body at the base of the crown before being baked to a finish. I have repeated some statements made in my article in the *Dental Cosmos* for February, 1901.

but it seemed necessary in order to make my clinic clear. I shall show you also a crown for short bite cases which I described in that article.

The Dentists' Supply Co., 109 West Forty-second street, New York, will supply the body in several shades and the enamel in any of the shades of the S. S. White shade ring. Dr. Close of 503 Fifth avenue, New York, will also supply his porcelain in any of the colors of the S. S. White shades.

A NEW PHASE OF THE COAGULATION QUESTION.*

By A. W. Harlan, A. M., M. D., D. D. S., Chicago, Ill.

The history of antiseptic surgery and disinfection is indissolubly connected with the efforts to render pulpless teeth sterile and preserve them in comfort and for future usefulness to the possessor. All work in the use of disinfectants and antiseptics has been done with a view to using the smallest quantity of a known agent to thoroughly sterilize or destroy putrid and septic matter. The work of Lister, Lionel Beale, Cheyne and the long list of recent names with which you are doubtless familiar tended in this direction. The first classification of the destructive and inhibitory power of drugs over mephitic agencies and mephitic gases was that of Miguel. Later this was found in the classic of Zeigler, and it was further carried on by Klein, Wolfhugel, Magnin, Sternberg, Macfarland and others. The main object of all experimentation in this field was to discover the properties of agents which would not be too injurious to adjacent living parts and still destroy the organisms or poison which was inimical to life. You can see at a glance in retrospect that all were working to the same end. Even the experiments of H. Knapp and others endeavoring to show that suppuration might be produced without an organism are of value, as were those of H. Charlton Bastian, the strenuous worker for the spontaneous generation theory, and those of Leibig, who tried to prove that fermentation was a purely chemical process, both of which in time were disproved by Pasteur. All work of this character necessarily partakes of the personality of the experimenter. He believes in himself—he may have a theory to demonstrate—a supposed fact to prove or disprove—his energy and enthusiasm will carry with him a few partisans who applaud, but if a new star arises who has a larger following many of the unthinking flock to the tents of the new prophet. It is not necessary here to refer to the work of Carl Heitzman on the odontoblast to remind you that great men differ as they see things differently, and they interpret them not always in the orthodox fashion. I value most highly the work of Heitzman because he stimulated others and encouraged them with his enthusiasm and helped them with his great learning, but not many of you now will be likely to subscribe to his views on the microscopical anatomy of the human teeth and adjacent parts. His was a striking personality and his energy and skill carried conviction to the minds of the late Frank Abbott, Atkinson and others, but newer and brighter lights have upset most all of his theories and to-day the work of Sudduth, Allan, Andrews, Mummery, Williams, Caush and others hold a place which Heitzman never could fill. I have gone over this little preamble to show you that you may have a theory which the facts may not bear out, and only the transforming hand of time with relentless stroke can rub it out of the catalogue of supposed facts. The history of the treatment of pulpless teeth I will not recite, as all of the teachers in schools have gone over the subject, and even the text-books have a little to say about it in these later days. Our reviews and magazines are, however, far in advance of the text-book makers. The real truths of science and practice seldom get into the text-books without the addition of the personal equation of the author. I suppose to-day the general belief is that all coagulating drugs readily pass through the sides of the roots of teeth, through dentine, cementum and peridental membrane, because a few experiments out of the mouth showed that this was the case under certain conditions. I will recall to your attention the experiments of Kirk, Truman and York on this subject. With these you are doubtless familiar, as all of them have been published in the *Dental Cosmos, International Dental Journal* and the DENTAL REVIEW. The main proposition of the above trio of experimenters was that if the apex of a root is filled hermetically, that a drug, carbolic acid, chloride of zinc, creosote or other coagulant, being introduced into the root by some precise method, in a few hours each drug would pass through the root and that a coagulum was no barrier to the diffusing of such substance through it and the surrounding tooth substance, dentine, cementum and the adjacent soft tissues. It was well known for years that coloring matters would be diffused throughout the dentine of a tooth, when soluble in water, with the single exception of silver nitrate (one of the best coagulators to be found in the whole list), but most of these gentlemen fought shy of this agent, as it would not or did not fulfill the requirements of a coagulator that would pass through a coagulum (see the DENTAL REVIEW, February, 1895, experiments before the Chicago Dental Society, by A. W. Harlan). In order to determine the diffusibility of a drug through the sides of the root of a tooth I submit the following method: Destroy and remove the pulp from a tooth and fill the apex of the root with some substance that will seal it hermetically. Introduce on cotton or silk some 95 per cent carbolic acid. Seal this carefully into the root with oxyphosphate of zinc; leave it therein twenty-four or forty-eight hours, then extract the tooth, carefully wash the exterior of the root with distilled water and preserve this. Now suspend the root of the tooth in bromine water and you will soon find that the tooth root has not been permeated with carbolic acid when it was in place in the jaw. (Take the bloody water that you have preserved in washing the exterior of the root, add one-tenth in volume of hydrogen peroxide to decolorize the red blood corpuscles. Filter this, test it for carbolic acid by the bromine water test. If you do not get the reaction the experiment has been a success as showing that carbolic acid does not pass through the sides of a root, dentine, cementum and peridental membrane when the tooth is implanted in the jaw.) Repeat this experiment with a 20 per cent silver nitrate solution and the results are always *nil.*‡ In order to further demonstrate the fact that coagulating agents do not pass through or diffuse themselves through a coagulum you can use pure wood creosote and you will get the same result.* It is likewise futile to expect an agent such as zinc chloride to pass through its own coagulum when its affinity for water has been satisfied. Corrosive sublimate precipitates its own coagulum, through which it does not pass.† Trichloracetic acid** in solution of 20 per cent was found useless as a diffusible agent through dentine, cementum and peridental membrane. All of the certain precipitators of albumen fail to penetrate their own coagulum and the tissues of the tooth. I have not contended that a tooth hollowed out by caries and mechanical agencies contained enough of the glue-yielding substance to form a perfect coagulum, but I have contended and do contend that if a putrescent tooth pulp is removed from a tooth and powerful coagulating agents are introduced, if there was a need for disinfection, that the object was defeated, as the agent produced a coagulum which was a barrier to the diffusion of drugs like carbolic acid, bichloride of mercury, creosote, chloride of zinc and silver nitrate. I am glad that a better knowledge of drugs is being slowly diffused through what I am pleased to term the mind of the laity of the profession, as it was absolutely necessary for us to pull away from the traditions of the supposed value of disinfecting agents. It would matter little if all coagulating drugs did pass through the dentine and cementum if they were equally effective as disinfectants with those that have no coagulating properties, but they are not. If you will look at the lists and tables proposed by Miller, by Sternberg, by Macfarland, Senn, Bowhill and others you will see that such substances as carbolic acid, zinc chloride, creosote and absolute alcohol are feeble compared even with peppermint, turpentine water or chloroform water. In the disinfection of pulpless teeth the first necessity is to render the canals surgically clean with substances that are soluble in water. Water is the great menstruum, and if any mephitic gases are present they must be washed out or be displaced. How absurd it would be to ask any one at this day to wash the root canal with 95 per cent carbolic acid or pure wood creosote or a 50 per cent solution of chloride of zinc, without first using an aqueous solution of some drug that would displace the gases and dissolve or destroy the putrid matter! It is far better and safer and more scientific to use a one or two thousand bichloride solution slightly acidulated, or a 5 per cent boroglycerine solution or one-half one per cent solution of dried sodium carbonate or even hydrogen dioxide than any of the above mentioned powerful coagulators of albumen. I desire to impress upon you the fact that to disinfect is to cleanse, to wash out, to displace poisonous matters, not to cook them and paint them over and seal them in the dentine of the tooth, unless they may come under the head of agents that will redissolve their own coagulum, because the power to concrete or coagulate as soon as the affinity of the coagulant for water is satisfied, is not added to, but it becomes feebler and feebler until the coagulum is not a protective to the territory it occupies or covers. How many of you have opened into a tooth that has been soaked, saturated with coagulating drugs and found a stench that was not primary. The coagulum broke down or the odors were imprisoned, not destroyed, and in time there was trouble. Avoid this. All surgery is aseptic even when surrounded by poisons and the poison makers, in putrefaction these must be eliminated and present methods in modern dental surgery substituted where perfect asepsis is not possible, such poisons must be eliminated by dilution and in circumscribed places, poisons and poison makers must not be semi-cooked and smothered, but they must be burnt up or cut out or absolutely disinfected with substances of a noncoagulating nature, or those at least which will render them innocuous.

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*Read before the American Dental Society of Europe.

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‡Scheumdige test for nitrates, 1 to 87,000.

*As creosote is only sparingly soluble in water 1 to 80, you can appreciate this, although it is a good coagulator of albumen.

†Egg albumen being the normal antidote for poisoning by corrosive sublimate.

**Saltus test, 1 to 7,891.

THE TECHNICAL TRAINING OF DENTAL STUDENTS.*

By S. H. Guilford, D. D. S., Ph. D., Philadelphia.

Mr. President, and Members of the American Dental Society of Europe:

When, a year ago, in an unguarded moment, I gave my consent to travel four thousand miles to meet with you and read a paper before your Society, it seemed as if the long journey would be the principal part of the contract I had taken in hand. When, however, the time came to decide upon the subject to be treated of in the paper, I found myself in a dilemma such as I do not often encounter.

An attempt to explain some of the later practical ideas in crown and bridge work, in orthodontia, or in porcelain work, would, it seemed to me, be like "carrying coals to Newcastle," for upon all of these subjects you are about as fully informed as we in America are. It finally occurred to me that as every one of you had graduated from some American dental college, most of you very many years ago, and as you remembered college methods and facilities as they existed when you were there, it might be of interest to have me tell you what changes have worked their way into the college curriculum since you were students, and how greatly improved are the methods by which to-day we mold the raw material of youth into the skillful and confident graduate.

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*Read before the American Dental Society of Europe.

Some of you, I am sure, are old enough to remember the time when those entering a dental college came from the office or laboratory of a practitioner and preceptor, where they had received some drilling in the methods of doing artificial work, possibly a little in operating, and had read portions of one or two old editions of their preceptor's college text-books. They often came feeling that they knew a great deal, although not infrequently admitting that they had still something to learn. What they had learned and felt proud of, frequently turned out to be antiquated methods of procedure which were in vogue when their preceptors first entered upon practice. The college methods had moved with the times, and were modern and up-to-date. To learn these newer methods it became necessary for the student to unlearn what he had previously been taught, and this proved a most difficult matter. To the college teachers it also proved a great drawback, for there were almost as many different methods of doing things as there were students, for each office from which they came had its own ways.

To-day, as you know, this is almost entirely changed, and probably not one-fourth of those entering college have been in a dental office as students or workmen.

Teachers to-day prefer to take the raw material, and shape it to their own liking. It makes their work lighter and pleasanter, and the results are more uniform and satisfactory.

True, to do this and do it properly, has necessitated a large addition to the college equipment, in space, in time, and in teaching force, but these count for little when the desired object is attained. If the old method of private preceptorship has fallen largely into disuse, as it has, we must not omit to give it credit for one good feature which has thus far been entirely lost through its decadence. When in former times a young man sought a position in a dental office as pupil or student, he was accepted only after the intended preceptor had satisfied himself that the youth possessed some inherent qualities, such as mechanical taste or ability, that would make him an apt pupil and eventually a good dentist. Even after acceptance the student held his place only tentatively, for should it appear that he was not really adapted for the work, he was discharged and the position given to another.

In this way the material was sifted, and only those reached the college who had given positive evidence of their adaptability to the special work. This is the reason why, from twenty to forty years ago, the college graduate, in spite of the inferior methods of college training, nearly always became a successful practitioner. The man developed and continued developing after he left college, and he did so because he had within him those natural qualities which go to make up the good dentist. Men of those days are found among the best teachers and practitioners of to-day.

Under the new order of things we do not know the capabilities of those who apply for college entrance, and all are accepted, conditioned only upon their having had a liberal general education upon which to found their technical studies. Once entered, there is no available way of turning them back should they prove slow of mind or clumsy of hand, for both teacher and pupil keep hoping for improvement until the end of the course is reached.

To those not familiar with the fact, however, it is surprising to note how much can be done with students of varying capacities by the orderly and systematic methods of training in vogue to-day.

For the sake of uniformity in teaching, and the proper arrangement of first-year students into groups or sections, all are obliged to pursue the same preliminary training, whether they have had previous office experience or not.

The late Professor Leidy, with a world-wide reputation as an anatomist, was accustomed to tell his class in the first lecture of the session that "he presumed that they knew nothing of anatomy, and therefore he would begin at the bottom." It is a good plan, and works well in practice.

After supplying himself with the required set of tools as published in the lists, the student is taught the proper name and use of each tool. After this he is taught how to use them in actual work. In some schools the first thing done is to take a blank piece of wrought iron, with three round holes in it, fasten it in the vise, show the student the proper position to take, and then teach him the various methods of filing—cross, oblique and draw-filing. When he has learned to use the flat file correctly, so as to be able to produce even surfaces on the ends, sides and faces of the piece, he is taught to use the round, square and three-sided files, in converting the three blank punched holes into a round-tapered, a square-parallel-sided, and a triangular one. Into each of these he is required to fit an iron plug made from an ordinary large wire spike, and each one must fit accurately, for accuracy is the object in view. The operation may have to be done many times before a satisfactory result is obtained.

The next step is naturally a more difficult one, and consists in filing out some conventional design, such as a trefoil or spearhead, in a piece of moderately thick brass plate, and afterward filing other pieces of brass to accurately fit into these openings. Where so many margins are involved, it is exceedingly difficult to obtain an accurate adaptation at all points.

The object of all this practice work is to teach the student the proper use of the commoner tools, to train his hand and eye, and to make him careful and accurate in his work. The result is shown later, when the student files and fits his metal plates, adjusts his backings or stays to the plates and the teeth, and in the accurate adaptation of clasps.

This foundation work completed, he is taught the classes, kinds and forms of the natural teeth. From a great number of extracted teeth he is obliged to name those selected by the instructor, and afterward himself to select from the mass such as the instructor calls for. This is continued until he is thoroughly familiar with the general external anatomy of each of the thirty-two teeth. Now follows the study of the internal anatomy of the tooth. One tooth of each class is attached to a wooden block, and placed in a vise. With a coarse, rasp-like file the student files the tooth down until he reaches the middle of the pulp-chamber and canal. Besides a mesio-distal section, a linguo-labial one is also made, and in some cases cross sections are required. In this way he becomes familiar with the size and location of the pulp-chambers and canals of the different teeth, as well as the relative thickness of the dentine, cementum and enamel at various points. To help fix all of these more firmly in his mind, silhouettes are printed from the various sections in a book by the aid of a copying pad. Afterward, in order to prove the accuracy of his knowledge of tooth anatomy, he is required to make free-hand drawings of many teeth, enlarged, but properly proportioned and shaded.

All of the foregoing is, in a certain sense, analytical work, and he is now advanced to the synthetic or constructive part. He is taught to model in plaster or clay or soap certain teeth on an enlarged scale, and to reproduce in them all the fine anatomical features that are found in the natural teeth which serve him as models.

As a last feature of his preliminary technic work, he is instructed in the reproduction of the forms of the natural teeth, life-size, in bone or ivory.

For this requirement his tools are purposely limited. With a jeweler's saw, a file, and a graver, the student who has taken full advantage of the preceding training, and who possesses the artistic instinct even to a moderate degree, will in a short time carve a tooth from his rude block of ivory, which is as nearly as possible a counterpart of the natural tooth before him.

He uses no caliper or gauge to aid him in the matter of proportion, but depends upon his eye, as the artist does.

He is now required to mold or carve crowns of plaster, enlarged many times, and in these to form typical cavities according to fixed rules. They must be of proper outline and form, the walls must have the correct angle, the depth must be proportioned to the width or size of the cavity, the anchorages suitably placed and the margins made strong and smooth.

All of this is done on a very much enlarged scale, in order that the finer points of the work may be made more evident, and that the instructor may the more easily point out to the student any inaccuracies in his work.

Once the student is able properly to prepare cavities on a large scale, he is required to repeat the operation on ivory or bone teeth of natural size, or nearly so. He is furnished with a set of factory-made teeth, which he mounts in an iron frame having the form of the natural arch.

In these the student forms his cavities in preparation for filling. The iron frame may be screwed to the bench or attached to an upright iron rod set at an angle to simulate the position of the human jaw when the patient is in the chair.

The cavities prepared, some are filled with the various plastics, some with tin, and some with gold. In many schools natural teeth are employed for instruction in cavity preparation and filling, in which case they are imbedded in a block of plaster instead of fastening them in a frame. Sometimes both methods can be combined to advantage.

When the frame is used it has the further advantage of serving the purpose of instruction in the placing of napkins, adjustment of the rubber dam, and the application of the various clamps and separators, all of which must be practically taught.

As a last step in the teaching of operative technics, the student is given natural teeth with large cavities in them. He is taught to excavate a cavity which is in close proximity to the pulp, and how, without exposing the organ, to antisepticize the remaining layer of dentine and cover with a nonconductor. In another case exposure is made, the pulp medicated and capped according to several methods. In still another, the cavity is extended to include the pulp chamber, the pulp débris removed from the chamber and canals, every portion sterilized, and then filled with the various materials which are commonly used in successful practice.

Every step of the work is watched and directed by demonstrators, and when once the student has learned to properly perform the various operations just described as he would in actual practice, and not until then, is he permitted to take charge of a patient in the infirmary.

All the work I have outlined is, as you see, purely technical in character, and all but the very beginning pertains to the operative branch. In some schools everything described is performed during the first or freshman year; in others the filling and treatment are held over to the early part of the junior year.

What I have described to you, however, does not begin to complete the technical requirements of the freshman year. The student must have his prosthetic training as well. This is just as fully taught as the operative portion, and occupies about the same amount of time. The student is required to take impressions in plaster and other materials of both dummy and natural jaws, and he does this until he has become reasonably proficient.

Then follow the various manipulative stages in the construction of dentures of vulcanite, celluloid, cast metal and swaged metal. Repairing in its various forms is also thoroughly taught and practiced.

During the second year he proceeds to more advanced work. Having made progress in prosthetic technical work during his freshman year, he is now allowed to take impressions and construct dentures for infirmary patients, and having become proficient in the technical work of operative practice, he is assigned patients for whom he performs the various simpler operations pertaining to actual practice. He prepares and fills cavities with tin and the various plastics, undertakes simple gold fillings, cleanses and extracts teeth, and treats pathological conditions if they be not too difficult. He continues this work for several hours daily throughout his junior year. He is also advanced in the prosthetic line, and takes up the technic work of crown and bridge construction. As this is difficult and very varied in its character he is kept at it for many weeks, so as to familiarize himself with all of its details and make him proficient.

Coincident with this, he also begins the construction of regulating appliances in their almost numberless variety, using natural or ivory teeth mounted in metal forms or plaster models.

During the third year his lectures are fewer than in the second and this allows him more time for actual practice in the infirmary. Having previously completed all of his technical work, except that of porcelain crowns and inlays, he is now quite well prepared for general infirmary work, and not only performs the operations which occupy most of the practitioner's time at the chair, but he constructs crowns, bridges and regulating appliances for such patients as require them.

In many schools certain hours each week for the first half term of the senior year are devoted to teaching the technique of porcelain inlay work, while during the latter half of the term the student applies the knowledge and skill thus gained to the construction and insertion of inlays for the patient.

As all of you very well know, the best samples of the student's work in all the various lines, after passing the inspection of the demonstrators, is submitted to the respective professors for approval and grading.

At the risk of having wearied you with so much detail, I have tried to give you some idea of the character, the completeness and the progressive character of the work by which we gradually mold the raw human material into the graduate dentist ready to begin practice, and able, we trust, to serve his patients in a skillful, intelligent and satisfactory manner.

I have not described the didactic teaching, the advancement made in class room methods, or the improved character of the present day text-books. Such was not my purpose, for the time at command would, I believed, be better occupied in confining myself to the various features of technic or manual training instruction.

We teachers naturally think that we have now attained to a high degree of perfection in dental college instruction, but improvements must come in the future as they have in the past, and if they come as rapidly, or in as great number, neither you nor we will need to feel any fear for the future of the dental student.

THE HISTORY AND VALUE OF THE PHYSIOLOGICAL ARTICULATION OF THE TEETH.*

By Dr. J. H. Morrison, Connersville, Ind.

Those who are interested in the progress of the dental art doubtless fully appreciate the light that has been thrown upon its various branches by the painstaking care and labor of able and honored members of the profession in recent years. Miller and Williams and their many colaborers in the field of bacteriology have given a theory that more satisfactorily explains the phenomena of dental caries and offers a promising basis for a progressive system of treatment of that disorder.

The treatment of dental diseases has been rescued from a state little less than empirical and reduced to something like an exact science. I know of nothing in which the practice of to-day so differs from that of twenty years ago, as in that which may be comprehended under the term sterilization. Our knowledge of the chemistry and physical character of filling materials as well as of many other things of practical value has been greatly enlarged. Not the least to be mentioned is what is at present called the physiological articulation of the teeth, offering as it does an exceedingly valuable guide in the construction of artificial dentures and bridge work, and in all operation in orthodontia. By physiological *articulation* I mean the various relations the lower teeth assume toward the upper during the complex movements of the mandible in mastication, in contradistinction to *occlusion* which refers to the position of rest when the teeth are closed. I had thought that an historical sketch of the development of the subject would emphasize its value more than anything else, and had hoped to present it in that way, but I find that the resources at my command and the limited time would allow me to speak only in general terms.

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*Read before the Indiana State Dental Association.

To secure the desired articulation of artificial teeth the older practitioners resorted to a method that is still familiar to many of you and still used to some extent in mounting specimen cases. The plaster of which the model was made was extended beyond the palatal border of the impression from one and one-half to two inches. This extended portion was neatly squared up and a transverse groove cut in its surface near the posterior border. On this a model of the occluding teeth was cast also with an extended portion which would have a ridge fitting into the groove of the first piece. These two pieces of plaster formed both model and articulator. It gave the occlusion only or apposition of the teeth when at rest. It permitted not the slightest change in the relation of the models and if the operator wished to open or close the bite he was advised to go back to the patient and make the correction on the wax models in the mouth.

In the description of this early method it is advised that the distance of the transverse groove from the incisor teeth be the same as that from the incisor teeth in the patient's mouth to his external auditory meatus. This is the first reference I find to the relation of the articulation to the hinge which controls it, showing that these early workers recognized something that came largely to be overlooked when metal articulators came into general use. The metal articulator was introduced to save the labor of making the old plaster one and to allow slight changes to be made in the relation of the models to each other with the idea that a suspected error of the bite might be corrected in the articulator. But as late as 1875 I find the author of a popular text-book expressing a preference for the old plaster articulator because the metal ones encouraged carelessness and because changes in the relation of the models was a very doubtful procedure. The author's objection will be appreciated if we remember that the opening or closing of the articulator in the smallest degree will destroy the accuracy of the occlusion unless the models are mounted on the articulator at precisely the same distance from the hinge as they are from the condyle in the mouth. Metal articulators, however, came into general use and from 1860 to 1895 many forms were offered, some providing means for adjusting the relation of the models, and at least as early as 1875 some of them imitating the lateral movement of the jaw. With the exception of that of Dr. Bonwill I am not aware that any of them had the hinge or pivotal joint constructed with reference to the intercondyle measurement of the jaw. Dr. Bonwill informs us that his anatomical articulator designed to reproduce the exact movements of the mandible was invented in 1858. Not until much later however, did Dr. Bonwill read a paper before the Delaware Dental Society describing his system of articulation. This was followed by another article in 1885 and still another before the World's Columbian Dental Congress in 1893, and the world is now familiar with Dr. Bonwill's system of articulation of the teeth and his theory of the equilateral triangle.

It is not my purpose to review all the theories of Dr. Bonwill, but will merely summarize. Observing that the distance from the condyle to the tips of the incisors was approximately the same as from condyle to condyle he established the fact that in the movements of the jaw the teeth must move as would points situated on or near the side of a triangle pivoted upon two of its angles.

When the jaw is protruded, bringing the incisive edges of the anterior teeth together, the distal cusps of the lower second molars should be in contact with the upper teeth all other teeth being free.

When the jaw is thrown to one side the condyle upon the side toward which the jaw moves remains in its seat or slightly rotates and the opposite condyle moves forward. This should bring the buccal cusp of the upper molars and bicuspids on the side toward which the jaw moves upon the lingual cusps of the lower teeth. And on the opposite side the buccal cusps of the lower teeth should rest upon the buccal cusps of the upper and the lingual cusps upon lingual cusps.

The overbite is determined by the depth of the cusp of the first bicuspid, and incisive action is provided for by the curvature of the occlusal line in the region of the molar.

These were regarded as the ideal movements of the teeth in mastication and those that Dr. Bonwill's articulator and elaborate system sought to secure in the articulation of artificial teeth.

Whatever honors the profession accord the memory of Dr. Bonwill it cannot deny him the distinction of having been the first to announce the principles involved in the equilateral triangle. They are the fundamental principles controlling the movement of the teeth and must be the basal principles in the articulation of artificial teeth so long as the human jaw is constructed as it is.

In an article published in a September journal of 1899 Dr. Bonwill says: "I here revise all I have said on this most important of my life's work and upon which I am willing to die feeling assured that this work can never be blotted from the world's record." These words were prophetic, for the October number of the same journal recorded the death of Dr. Bonwill, and to-day the main principles for which he so long contended are acknowledged throughout the world.

These theories were received with enthusiasm by many, but judging from what I can learn from the journals they were received by the profession generally with some indifference. Many stated that after the most careful work in mounting the teeth in the articulator when the teeth were placed in the mouth they would not behave as on the articulator. Something seemed wrong. Recently it has been thought that the difficulty lay in the fact that the method provided for accuracy only at the incisors in locating the model on the articulator leaving the position of the posterior portion of the model to guesswork. To meet this difficulty the Snow face bow was invented, by the aid of which a model may be placed upon the articulator in approximately the same relation to the pivots as the teeth in the mouth bear to the condyle. But there was still another step in advance to be taken.

A few years ago and independently of the studies of the subject by the dental profession there appeared in one of the dental journals an abstract of a paper read before a society of histology. The paper gave the results of extended observation of the teeth of animals made for the purpose of ascertaining what the arrangement of the teeth had to do with the evolution of species. It was shown that in most carnivorous animals the teeth had long sharp cusps, the jaws of equal breadth and the rows of lower teeth in line with and immediately under those of the upper, the jaw using the vertical movement only during mastication. In many omnivorous animals the upper jaw was wider than the lower, the upper molars and bicuspids overreaching the lower on either side. The cusps were still prominent and were found to be arranged upon circles centering at the condyle or at some point between the condyles.

The concentric circular arrangement of the cusps is the point of special interest.

In 1895 Dr. W. E. Walker of Pass Christian, Miss., read a paper before the Southern Dental Association, giving an account of his extended studies of the glenoid fossa and the movements of the mandible. This was followed by other papers on the same subject in 1896-97-99. Dr. Walker's investigations seemed to show, first, that in protrusion or during the lateral movements of the jaw the condyle travels downward as well as forward, and that the downward travel is caused by the slant of the roof of the glenoid fossa.

Secondly, the line traveled by the condyle intersecting the facial line forms an angle that bears a vital relation to the angle formed by the line of occlusion of the teeth or of the alveolar border with the facial line, and that this condyle alveolar angle must be reproduced in the articulator before perfect articulation of the teeth can be secured.

It is stated that the condyle alveolar angle ranges from 25 to 45 degrees and is frequently greater upon one side of a jaw than upon the other.

It had been previously thought that during the lateral movements of the mandible one condyle remains stationary while the other moves forward. It is here shown that frequently one condyle moves slightly backward while its fellow moves forward; this has the effect of shifting the fulcrum or pivot from the condyle to a point between the condyles, and so shifting the circles upon which the cusps of the teeth move. This explains the concentric curves mentioned in the paper on histology to which I have referred, and discloses another factor in the condyle movement to be taken into account in efforts at perfect articulation.

Dr. Walker produced a facial clinometer for measuring the various angles to which his work refers and an articulator adjustable to these angles and designed to reproduce the exact movements of the jaw. These I will not attempt to describe but close with a word as to the value of the theories outlined.

The condyle is hanged in the glenoid fossa by flexible ligaments and allowed more or less movement in all directions and it may be suggested that the angles and movements referred to are too minute to be applied under such circumstances. It will be remembered, however, that the form of the skull or bones does not vary so much as does that of the muscles, so the movement of the jaw being controlled by the form of the condyle and of the glenoid fossa will be more definite than might be supposed.

The fact that twenty-five years were allowed to elapse after these principles were announced before their value was generally recognized, and this at the very time prosthetic dentistry was retrograding, would seem to indicate that an opportunity had been lost.

A glance through the dental journals will show that as early as 1875 a complaint came frequently to be made that prosthetic dentistry was degraded, and this was so often repeated that many came to think that as professional men mechanical dentistry was beneath them. The older practitioners thought that this degradation was because of the introduction of cheap materials, notably rubber, instead of gold and silver, this bringing cheap, careless methods. But the artist is known not by the material with which he works, but by the truth, harmony, and beauty displayed in the results he secures and the knowledge manifested of the fundamental principles of his art. If prosthetic dentistry has fallen out of its proper relation to operative dentistry it is because the profession has failed to give it that careful and painstaking investigation that has characterized the progress of conservative practice.

It is a matter of common faith that the food of man should be reduced to a pulp before it passes into the stomach.

Dr. I. N. Broomel in a recent and very interesting article takes the position that each temperament is provided with a dental arch characteristic in form and in the length of the teeth cusps and so indicates the class of food upon which that temperament should be fed. Deprived of that food or of suitable dental organs to properly masticate such food the person suffers in health.

Dr. Black has shown that teeth with prominent cusps have a much greater crushing power than those with smoother surfaces. And I have referred to histology or rather comparative anatomy as showing that the most effective arrangement of cusps is of circles concentric with the condyle or some point between the condyle.

Dr. Walker's investigations seem to show that even after the loss of the teeth we have in the movements of the condyle an index of temperament and form of teeth that should be supplied.

The complete attrition of food is accomplished by the short lateral movements of the cusps of the teeth by and over each other, but these movements cannot be perfectly accomplished if well defined cusps are placed without system or at haphazard. But by arranging them upon a system of circles concentric with pivotal centers and in known relation to each other we may secure the highest efficiency as regards the mastication of food, and a form of occluding surface that will greatly increase the stability of the plate.

A practical side of the question, I think, may be found in the education of patients. Few of those who come to us for artificial teeth recognize any requirement beyond the sticking qualities of the plate. Some instruction given to the patient as to the mechanical principles involved, pointing out the various positions where the plate is balanced, such as the touching of the molars when in the incisive position, will greatly enhance their appreciation of the work and more than anything I know of distinguish the cheap shop work from that of him who applies the real principles of his art.

I think no one has been so quick to recognize the value of physiological articulation as have specialists in orthodontia. Successful work in that department demands a careful study of all the forces which influence the dental organs. The action of the cusps upon each other cannot be well studied in the mouth so it becomes a matter of inestimable value to be able to place models of the teeth in an articulator that will precisely reproduce the movements of the jaw. We can then study effectually the action of the forces against which we have to contend or of which we hope to take advantage.

The principles under consideration are of no less importance to the crown and bridge worker. The position is taken by many excellent men that the pulp of every tooth condemned to receive a cap crown should be removed, believing that the pulp of every tooth so crowned will eventually die. Beyond the fact that teeth which are crowned are generally more extensively decayed than others I can see no reason for this opinion. I suggest that the secret may be in an inarticulating occlusion. We began making crowns upon ideal or selected forms. This soon proved unsatisfactory and we passed on to carving cusps to correspond to a bite taken from the occluding teeth. But suppose cusps are placed upon a tooth that occlude perfectly when the jaws are at rest, but ignore the lateral and circular sweep of the occluding cusps a tipping or wrenching results that must either wear away the cusp or set up a disturbance that ends with the death of the pulp. Bridge work reaches its highest value in providing a substitute for lower buccal teeth. If models of natural dentures that have lost one or two lower molars or bicuspids be placed in anatomical articulators, it will frequently be found that the tipping of the remaining teeth has destroyed effectual articulation. The teeth can be chopped up and down, but the lateral grind of the cusps upon which mastication so much depends is very imperfect. None so well know the value of a small grinding space as do the victims of artificial teeth or those whose articulation has been destroyed by extraction.

In constructing such a bridge it is worth while to place the models upon an anatomical articulator and by the aid of its movements and careful attention to the smallest factors secure the greatest amount possible of the scissor-like action of the cusp for the action of a very few cusps toward each other may determine the value of the bridge and really stand between the patient and ill-health.

SOME POINTS IN DENTAL PRACTICE.*

By H. G. Logan, D. D. S., Aurora, Ill.

When the chairman of the executive committee extorted a promise from me to write a paper for this occasion, he expressed a wish to make the meeting as practical as possible. I have reasoned that if I am to produce anything practical it must necessarily be about something in my regular work or pertaining thereto. Having no particularly new theories or methods the subjects considered will probably be those about which we all have an extended experience. No claim is made to originality. If some one should state that what follows was performed in a similar manner several years B. C. I promise not to be surprised and may consider it but an additional proof of the wisdom of the ancients.

A useful bicuspid crown less conspicuous than the all-gold shell or the porcelain faced bicuspid crown may be made in cases where the root when trimmed down presents an unbroken horizontal surface as follows: Make a Richmond cap consisting of post or posts, band and top soldered by not less than 20 K. solder. Place finished cap on root, select and grind to occlusion a suitable plain bicuspid tooth and stick to place with hard wax. Remove cap and tooth in this position and trim away superfluous wax. Cut a pattern from paper or tin foil for a band which will surround the tooth and unite with the cap. Cut band low buccally but high enough lingually to enclose lingual cusps. Unite this band with 20k. solder; remove wax from cap, place band in position, invest and unite to cap with 18k. solder, flushing it out buccally. Try on the root, remove, set the tooth in cup with cement, afterward set finished crown.

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*Read before the Northern Illinois Dental Society.

This crown was described some little time ago in the *Dental Cosmos* and was termed the J. Y. Crawford crown. I have used it with a great degree of satisfaction.

Some advantages claimed for this crown are—less conspicuous than the shell, easier to repair than where facing is soldered, access to a larger number in selection of a suitable tooth form and no firing of the porcelain.

Use of the matrix in compound amalgam fillings—some of us *do* use amalgam.

It hardly seems possible that any one would attempt to put in a mesio or disto-occlusal amalgam filling without using a matrix of some sort, and yet I cannot account for some work on any other theory. I have recently seen some in which more amalgam was packed into the interproximal space between the teeth than was used in the filling. As for the kind of matrix to be employed that depends, as Sam Weller would say, upon the taste and fancy of the operator. The main requirements are that the material should be thin and capable of being fitted and held to the gingival border. Thin steel sheets, nickel or tin strips cut for each case seem to answer the purpose and possess advantages over fixed matrices in some particulars, as they can be bent or cut to suit and are more easily detached with less danger to the filling.

Do you use oxpara in the treatment of putrescent pulps? Since using this remedy I have had less trouble than formerly with those cases of incipient pericementitis where the patient applied with a "sore tooth," and which sometimes run to an alveolar abscess despite the use of all the standard remedies, such as the essential oils, etc. The manufacturer also makes claim to its usefulness as a canal filling. Of this I have had no experience.

A useful instrument, easily formed and sharpened, may be made from worn-out burs of various shapes and sizes by use of emery or finer lathe stones, flatten the two or four sides, as case may be, forming a drill, not pointed, but shaped more nearly to a chisel edge. Finish the sharpening on a fine Arkansas or other stone. The best kind of a drill of this class is made from an old cross-cut fissure bur, ground on the two opposite sides only, leaving the natural serrations on the edges.

A class of cavities which used to be difficult for me to form and fill are those occurring in the distal surfaces of cuspids, both upper and lower, and when, as is usually the case, the operator is compelled to work without the separation desirable. On account of the peculiar angle necessary to assume with instruments, and the position of the other teeth, it is difficult to get undercuts or to fill them when formed, especially those toward the cutting edge. These cavities are made much more simple by cutting lingually and forming a wedge shape to that part of cavity, making, when finished, practically an immovable filling, also conserving the labial surface of the tooth to the greatest extent possible. This, I presume, is but a repetition of Dr. C. N. Johnson's teachings on this subject and in less graceful language than he would employ, but good things will bear often repeating.

While on the subject of cavity formation I am led to say that I have thought it would be a good idea for some authority capable of enforcing and inflicting a suitable penalty for the violation, to enact a law in regard to bicuspids and molars, somewhat as follows: When shaping a cavity on either mesial or distal surface of these teeth, which cavity when filled shall present any part of the filling on the occlusal surface, the cavity shall be extended on this surface, forming a wedge shape to that part of the cavity and shall be extensive enough to contain a sufficient bulk of filling material, so that it may not be liable to break or separate at the mesio or disto-occlusal angle. I suppose we have all had many cases where the teeth have been filled by the "other fellow" where he had depended for retention upon undercuts buccally and lingually without the occlusal formation indicated. After a certain, or more correctly speaking, *uncertain,* time, were not most of these fillings either tipped outward, separated from the occlusal surface or out of the cavity entirely? Having seen quite a number of cases recently which would seem to me to be thus faulty it is evident that, strange as it may seem, every one does not agree with me in regard to this class of cavities in bicuspids and molars. I judge, however, in this case as with ministers who scold their congregations for nonattendance, that those needing it most are not present.

PROSTHETIC DENTISTRY.*

By Dr. E. C. French, Eau Claire, Wis.

It is not my purpose in this paper to give this society a long thesis on prosthetic dentistry in its various forms, but to call your attention more especially to that particular branch of prosthesis known as artificial dentures.

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*Read before the Northern Illinois Dental Society.

The entire profession during the last quarter of a century has been so occupied in keeping pace with scientific discoveries that very many of the most important duties we owe to a large percentage of our clientele have been lost sight of. It is for that class of our patients where cataphoresis, extension for prevention, cements, amalgams, gold, porcelain inlays and the most scientific treatment of pyorrhoea alveolaris have failed to keep them from becoming edentulous. It is for the edentulous I make my plea.

The introduction to the dental profession of vulcanized rubber as a base for artificial dentures marked the beginning of a decline in the highest forms of art in prosthetic dentistry. Unlike the rubber dam which has been so conducive to all that is best in operative dentistry, rubber, on the other hand, as a base for artificial teeth, opened the door to the sacrificial altar of the natural teeth, and following in its wake, no man can number the jaws that have been ruined by its use. It has been largely the cause of forcing a very large percent of capable and conscientious plate workers out of this branch of our dental art. It has cheapened our profession in the estimation of the public, and prosthetic dentistry is now looked upon as a mere commercial transaction, to be concluded with the dentist who will make a set of teeth for the smallest amount of money. It is the automobile in which the empiric seeks to ride into popularity in city and rural district. And so this, the most important branch of our profession, to the edentulous, is left largely to that class of men who have entered the profession for mere commercial ends. I boldly assert, without fear of successful contradiction, that there is no one branch of the dental art that requires more mechanical skill to bring to a successful conclusion than that of making artificial dentures. Let me ask, how many of you here are thinking anything more of your plate work than to use it as a means of occupying a little spare time you may have from your chair work? "Well," I hear you say, "It does not pay me anything." And so you soon lose your own self-respect as a plate worker, and your patient much sooner. Who is to blame, the patient or the dentist? Very largely the latter. We warrant a fit and guarantee our work to last five or ten years, and all for $5 or $10. Just think of it! A set of teeth for $5! Less money than one pays for a pair of handed down trousers. No wonder a very large per cent of the public look on us as a "stand me up" behind a bargain counter. If any one wants evidence that there is a crying need of a general awakening of the dental profession along this line, let him visit one or more dental laboratories and examine the impressions, models and articulating bites that are sent in upon which a denture is to be completed. The entire prosthetic outfit in 70 per cent of dental offices of the United States consists of a can of plaster, vulcanite file, scraper, vulcanizer, box of red rubber, polishing lathe, and a small selection of very small white teeth, and every applicant for a set of teeth get a set like the preceding one, all arranged in a three-quarter circle, for $5 up. A representative of one of the small dental supply houses of Chicago informed me that they were distributing about 10,000 sets of teeth a month. A tooth manufacturer a short time since stated to me that he had just closed a contract to furnish 3,000,000 teeth to one wholesale dealer. If this be true, and I have no reason to doubt it, when we take into consideration the S. S. White, Justi & Son, Sibley, Consolidated, Johnson & Lund and a score of other tooth manufacturers, and behold the pyramid of pearly white grinders they are turning out, is it not high time we stop in the midst of our boasting as leaders in the dental art and demand of its followers proficiency and knowledge of the better materials out of which to construct artificial dentures?

If any one here thinks my picture a little too highly colored, let him visit a State fair in Illinois, Wisconsin, Iowa or Minnesota, and he will see that nine-tenths of the people who wear artificial teeth can be pointed out by the glaring defects in the arrangement, size, color and entire lack of all the essential points that go to make up a symmetrical whole. I mention these State gatherings because you see people from all parts of the State and can judge very closely the general condition of prosthetic dentistry here exhibited.

Our tooth manufacturers are not giving us what we want, in shades, molds or sizes. It is almost an impossibility to find an artificial tooth that will shade perfectly with the natural teeth. Artificial teeth are all too highly enameled, and I am quite sure that this exceedingly artificial appearance of porcelain teeth would be largely relieved if they were entirely enamelless.

To illustrate, insert an upper denture, selecting teeth by solar light that would match as closly as may be the natural lower teeth, and then expose the teeth in your patient's mouth to artificial light and you will at once notice a glaring defect. Very frequently I denude all the teeth of enamel that are exposed in conversation or laughter. The saying that artificial teeth all look alike, as to color and size, is approximately true, especially in artificial light.

Again, the profession has been going daft over bridge work, and bridges are being indiscriminately applied where they are not applicable for use, or even ornamentation.

Fifty per cent of the people who are wearing bridges, or trying to wear them, would have been much better served as to appearance, comfort and usefulness had the dentist who inserted them the skill to properly adjust a gold plate.

Anticipating that some of you may ask what objection there is to using vulcanized rubber as a base for artificial teeth, I want to say that in my judgment 95 per cent of our patients would be better served with metallic plates. I have no objection to the use of rubber as an attachment for teeth to metal plates, and in very rare cases it is admissible to use it as a base. The argument that it is cheaper and many patients cannot afford metal plates is no longer admissible, for we now have a pure quality of aluminum, and plates can be made within the reach of all. Let me say, there is a very small per cent of cases that come to us for artificial teeth that plates may not be better adjusted with metal than rubber, if we know how to do it.

In conclusion: To such men as Dr. Bonwill, Dr. Haskell and many others we might mention, all honor is due for their unceasing efforts to keep the highest standards before the profession. Dr. Bonwill, in his eagerness to have the profession adopt his method of articulating artificial teeth, invited much harsh criticism from those who failed to grasp his ideas. But he has left us principles that will add luster to his fame in the coming years. He well said, "God Almighty had to wait 6,000 years for some one to find out the lower human jaw was an equilateral triangle, and I can well afford to wait 100 years for the dental profession to adopt my method."

A CASE IN PRACTICE.

By Z. W. Moss, D. D. S., Dixon, Ill.

The old gentleman whose case I am about to describe is sixty years of age. He came to me in August, suffering intense pain on right side of his face. Antrum symptoms not very strong. The greatest pain was located about where his third molar should have been, for in his case it had never erupted. He had been suffering for seven years, the pain coming and leaving at intervals, gradually growing more severe, until the last year he had never been free from pain. Physicians had treated him for neuralgia and in the meantime he had had all of the teeth removed from that side of the jaw, believing he might gain relief.

I treated patient at my office for some time with very poor results, finally I held a consultation with his attending physician, Dr. C. C. Hunt, of Dixon—whereupon we decided that an operation was necessary. At this time patient was suffering constantly with intense pain, was unable to take any nourishment except in liquid form, being confined for three days to his bed in this condition.

He was taken to the city hospital and I operated September 1, making an incision from the cuspid back as far as the third molar, which I found lying horizontally and surrounded by dead bone. Removed all dead bone. Working toward the antrum, I made an opening into antrum, which I found to be in a badly diseased condition. I made a thorough drainage possible by inserting a silver tube.

After this I cut down to the infra-orbital foramen through which passes the superior maxillary division of the fifth nerve, dissecting a piece from the nerve.

The question naturally arises, Why should I cut a branch of the fifth nerve after finding the antrum diseased? It was to give my patient instant relief, knowing he could not undergo another operation.

Patient suffered some pain for a few days following operation, improving with surprising rapidity.

I dismissed him from hospital in ten days' time, treated him at my office for another ten days, finally dismissing him in excellent condition.

PLATES AND OBDURATORS FOR CLEFT PALATE CASES DUE TO SYPHILIS.

By Dr. Henry J. Jaulusz, New York.

Very little has been written about the management of this especial class of cases, where a cleft has been made in the palate as the result of syphilis. These cases are not very inviting to handle, and the operator must protect himself during the work by wearing rubber gloves.

Before taking an impression cleanse the cavity made by the cleft with an antiseptic and smear it with sweet oil. Then soften some wax and press it gently into the cavity, getting an exact impression. Remove this and cool it. Replace it, and with a cloth wrung out of hot water smooth the under surface of the wax even with the natural palate. Insert some little wire hooks into the wax so that the loops hang down to be embraced by the impression material, which is now used to take an impression of the mouth in the usual way. Let it get perfectly hard before removing, so that when taken from the mouth the wax plug comes with it. This gives an accurate impression of the mouth and cleft, from which a model may be made.

The plate should be of gold, and before molding the model the cleft should be filled with wax, so that the plate is swaged across it. To close the cleft the method here illustrated is an idea of my own which has proved very satisfactory and which may be briefly described. In case Fig. 1, A is the model with the cleft, C is the plate, D a hollow box fastened to the plate and B a slide with a sponge fastened to it for absorbing the secretions which usually accompany these cases. The sponge may be changed by the patient as often as seems necessary for cleanliness.

Case No. 2 shows a double cleft, A and B. The natural teeth, two molars and a bicuspid on each side, having been badly worn down, are crowned (C). The plate, F, is shown with the two slides, D and E, corresponding to the double cleft and ready to receive the sponges.

In both of these cases the patients found great difficulty in speaking before the appliance was constructed, but with this in place speech was restored and the disagreeable discharge of mucus into the throat prevented.

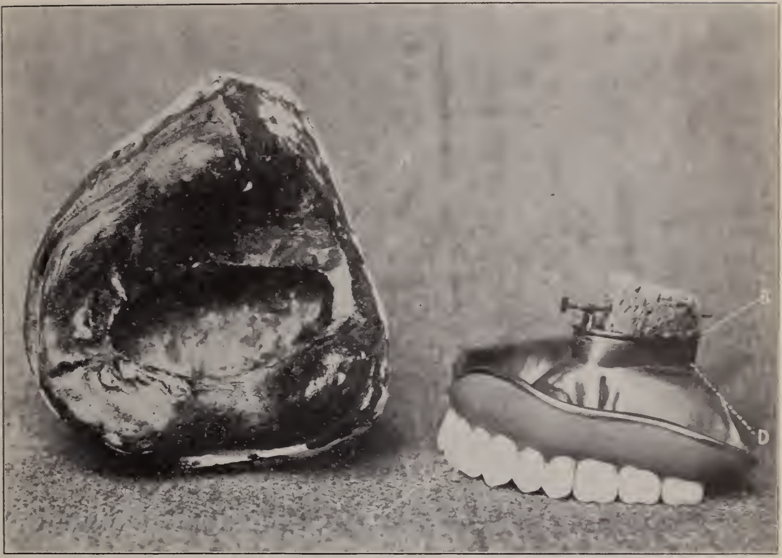

Fig. 1.

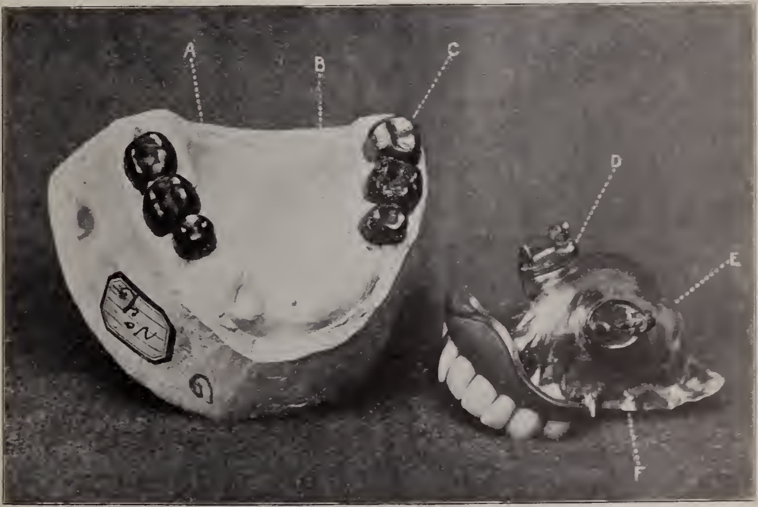

Fig. 2.

PROCEEDINGS OF SOCIETIES.

THE AMERICAN DENTAL SOCIETY OF EUROPE.

SECOND DAY.

Thursday, August 14.

Dr. W. E. Royce, President, in the Chair.

General Meeting.

THE PRESIDENT:

I cannot think of a better moment than this to read a communication which I have received from Dr. John A. Watling, dated July 18, 1902, as follows: "I regret very much to say that I find it impossible for me to be with you at the meeting of the American dentists at Stockholm. My health has not been good for the last year, and I feel that it might not be safe for me to undertake so long a journey. But as I cannot be present in person, I take the opportunity of sending you a gavel made by myself from a white oak knot, which I hope you will use to keep good order and a quorum, and when you have done with it you may turn it over to your successor as the property of the society. I have sent it to Dr. Jenkins, who will deliver it to you. With best regards to all my friends on the other side, I remain, yours truly, John A. Watling." I have much pleasure in showing you this very beautiful gavel which has been sent by our esteemed honorary member. At the same time I wish to mention something which I think has been hitherto overlooked. Our good friend, Dr. William Mitchell, last year, while he was presiding, also presented to the society a beautiful ivory gavel, and in his extreme modesty he said nothing about it. I would suggest that a motion be made with regard to the proper acknowledgment of these presents by the secretary.

DR. N. S. JENKINS:

I have much pleasure in proposing that the best thanks of the association be expressed to these two gentlemen, who have shown such kindness in presenting to us these gavels, and that the secretary be empowered to write to them expressing our acknowledgments.

The motion was duly seconded and carried with acclamation.

A paper was then read on "The Carving of All Porcelain Crowns and the Biscuit Bake," by Dr. W. A. Spring, Dresden.

DISCUSSION.

DR. CAPON:

I should like to ask Dr. Spring what body requires fourteen minutes to bake?

Dr. Spring:

That was in the Revelation oil furnace. I can bake it in six minutes with a higher heat. The same heat that will fuse a porcelain body in four minutes will fuse that in fourteen minutes, and that is just to indicate the difference between the two porcelains. It is not on the market, but at my request they prepared it for me, and they are ready to supply it to anybody.

Dr. Capon:

I do not think that any porcelain requires such terrific heat or such a time as fourteen minutes. In the Hammond electric furnace I fuse the molded teeth as they come from the factory in biscuit form in six minutes from the time the furnace is started. After it is going well I can do it in five minutes. I can do the White's teeth in half a minute or a minute longer, and I can do the others, although in a little gas furnace, in seven minutes. I happen to have something here that Dr. Spring is unacquainted with, and I wish to pass it round to demonstrate the advantages of carving, using a base body and enameling. These are the newer bodies that have come out in the last two years. I can corroborate what Dr. Spring says regarding the use of a base body, and the carving of enamel. It will stand a heat equal to Close's, which is about our standard. I agree with Dr. Spring in the use of Close's body, because I use it myself, but I think it is improved on very much. Again, Close's body has only one shade, except what you like to make with the heat. You can make a lighter shade, but you do so at the cost of the material. I can bake the color out of this I am passing around and put it on the wheel, and it will not be porous, and that is one of the great recommendations for the present high-fusing material. I have a little piece of bridge work here which has been in the furnace seven times, and you can see it stands the wear and tear. It was in the furnace through accident, not that it had to go through to make a decent piece of work.

Dr. Wassall:

Is this the Brewster body?

Dr. Capon:

Yes, the latest one out.

Dr. Wassall:

I have been using this body for about six months now and nearly everybody in Chicago uses it, and has been using it for two years. It is practically the same material he has been making for a number of years.

Dr. Capon:

Yes, but it is new here. There are at least a dozen dentists I have heard who are using it.

Dr. Wassall:

Mr. Brewster does not claim any special originality for this material. It is merely the body which is customarily used in England for English teeth. He has his own formulas, I suppose. It fuses about the same as Close's body, is very dense, and you can bake all the color out of it if you overbake. If you wish to grind it down when you get too much occlusion it is a very easy matter to do so and polish the material as you do English teeth. When ground down there is no danger of porosity or discoloration.

Dr. Capon:

I find it absolutely the very best material that was ever put on the market. Mr. Brewster is an Englishman and an English manufacturer of teeth. He has combined the English idea of appearance and low fusing with his ideas of high fusing.

Dr. N. Jenkins:

I should like to lay special stress upon this beautiful work that Dr. Spring has been so good to show us. It is exquisite work which requires the very highest quality of skill, judgment and taste. It is a work not only of the dentist but of a man of true artistic spirit. If one could venture to pass criticisms upon it it would be only perhaps in the words of the famous French writer with regard to the "Charge of the Light Brigade:" "It is magnificent, but it is not war." This work is magnificent, but it is not for every one; it is a work which a few gifted men can do, and do with glorious results, but I do not think it is a work which every dentist can readily do with the desirable degree of perfection. I am very much interested in hearing of the experiments of Mr. Brewster in America, which have been carried out apparently on the same lines that I have been carrying out my experiments with an attempt to produce in high-fusing porcelain what I have produced in low-fusing porcelain.

Dr. W. Mitchell:

The principle enunciated by Dr. Spring with regard to the advisability of carving crowns I can heartily indorse. I can see places where an artist like Dr. Spring can produce most beautiful results. The possibilities of porcelain work are only limited by the capacity of the operator. If he has the right appreciation and the possibilities of the situation are entertained by him, he can develop almost anything from porcelain. I find the carving of porcelain crowns a very lovely work and one of the most satisfactory branches of dental prosthesis. There is no question about the artistic side of it being all that we can desire, both for our own satisfaction and from the standpoint of a finished operation, and from the satisfaction that we can afford our artistic patients who will appreciate and pay for this kind of work. I had the pleasure last winter of being in Mr. Brewster's factory and seeing what he is doing in the way of porcelain work. Mr. Brewster has been working a great many years on porcelain work and has endeavored to combine the translucency of the American teeth with the qualities of the English teeth in regard to the fineness of texture, the ability to polish them and the strength of them. These he seems to have blended in a most admirable way. With regard to the fusing point of the Brewster's enamels, I find the fusing point will take the color out of the ordinary Ash tooth. Mr. Brewster has improved on the teeth made by the Dental Manufacturing Company and has changed the condition of affairs as compared with Messrs. Ash's, and I think that the finished product of work from the Brewster enamels approaches more that of the Justi teeth. The fusing point is such a good one that you can make a tooth such as Dr. Spring suggests in the most satisfactory way. Mr. Brewster has a special high-fusing body which he uses to make the center of his teeth, and he builds it up with the colored body according to the shade desired. By this means he secures a more perfect union with the platinum. Mr. Brewster went into this thing almost from the dentist's standpoint, which is a thing the average manufacturer does not do, and as far as high-fusing materials are concerned, I think we shall have to look to Chicago in the way we have had to look to Chicago for a great many other good things.

Dr. L. C. Bryan:

I am very much interested in this porcelain, which is one of the new and promising elements in our practice, and I would like to come to some conclusion in my own mind as to the relative values of the high-fusing and low-fusing bodies. We have representatives of the different schools here and each favors his own view of the matter. I saw an article recently by Dr. Jenkins, a short reference to some experiments he had made, in which he submitted specimens of his low-fusing body as it is made now. I understand that Dr.

Jenkins does not put the same value upon his first production of porcelain. He has been experimenting for very many years, and he assures us that he has got something which has been submitted to a test by some institution in Saxony with specimens of the high-fusing body by Dr. Spring, and the results arrived at by people entirely disinterested have led many of us to think that Dr. Jenkins had the most superior article not only in texture, in fineness and in density, but in edge strength, and if that is the case I think it will be something of a guide to us in coming to a conclusion as to what is the best. It seems to me that a low-fusing body is a thing for the average dentist, and the question is how can we come to a conclusion as to which is the best? I would ask Dr. Spring if he accepts the resolutions of the government authorities in Dresden as final?

Dr. Spring:

I am not convinced.

Dr. Bryan:

That is the point. We want some disinterested party. Would it not be well to have a conference of some of these gentlemen and endeavor to come to some conclusion on the matter? They might make a series of experiments in a disinterested way.

Dr. Bogue:

I suppose most of the gentlemen present know about the experiments made by Dr. Kalendar with continuous gum many years before we were born? The difficulty was in getting something that was fusible and would be enduring in the mouth. It would either break or discolor or do both, and some of it eventually seemed to undergo solution. I should be obliged to Dr. Spring and Dr. Jenkins if they would give us their experience on that particular point. We have all seen porcelain that failed after a time, and whether it was high fusing or low fusing we ought to know.

Dr. Jenkins:

When I began my experiments ten years ago I began in a very humble manner, and after I had worked for four or five years I thought I knew something, and was led to take risks which I would not take now. I put into the mouths of my patients fillings which represented the successive stages of progress. Some which I put in in the very beginning had a sufficient degree of hardness, but were too brittle and fractured at the edges and discolored. It was a long time before I discovered the cause of the discoloration. Not a particle of lead should be used in porcelains or in colors. It was my good fortune to have a clientele from which I had never any difficulty in getting a patient, and I tried the formulas one after another, and in due course of time I obtained what I believed to be a sufficiently good body. I was being watched by a few enthusiastic friends, who urged me when I had reached this stage to allow them to have specimens of this material to work with, and I somewhat weakly yielded. The first body that was put out answered the purpose tolerably well, but it was not sufficiently dense. As soon as I discovered that I changed my formula based upon an entirely new line of experience, and two and one-half years ago I produced my final result. I believe it is impossible for the body to be improved beyond its present condition. It seems to me faultless, and no one can have examined it with such great severity as myself. The failures which I made in the beginning have never disheartened me, because I was assured that with time and with patience I could reach the goal. With regard to the experiments carried out in secret by Professor Keyser, neither Dr. Spring nor I were admitted to the laboratory to inspect the work. He is one of the most distinguished men in the employment of the Saxony government, and I think his decision should be taken as unquestionably correct. Dr. Spring prepared for me specimens of high-fusing porcelain which were admirable examples of the skillful use which he makes of those materials. An easy test would be for a block of high-fusing porcelain to be prepared and some porcelain enamel to be melted on to the same thickness. Then it could be ground and it would be possible to see whether one is more dense and capable of receiving a higher polish than the other.

Dr. Spring:

My mention of fourteen minutes as the time for baking the body has led to a misunderstanding. I simply used that time to make a comparison between it and Close's body in point of fusing. I am able to fuse it in six minutes with a different heat in an oil furnace. This body very much resembles the body used by Woodman, of Boston, who has made carved teeth for fifty years. When I was in Boston last year I called on Mr. Woodman, and he showed me some crowns which he said he had just begun to make for the profession. They were not baked on any base whatever. There was a small hole in the top just large enough to admit the stub end of a dowel so that they could be placed on a base made by a dentist.

The dentists furnish him with the base and he makes the crown, attaching them with cement. Dr. Jenkins has kindly said that there is unusual skill required in making these crowns, but I think he is entirely wrong. It is a very simple crown to make, and it was one of the objects of my paper to show how easily the all-porcelain crown could be made. The base is made in a comparatively short time, and every one is familiar with the method from having made the banded Richmond crown. The rest is a simple matter, the baking of a biscuit bake, and the simple process of carving and baking. If any mistakes occur in the work one has not to go back to the patient and cause the patient unnecessary pain. In the beginning I made the mistake of overbaking the biscuit bake, and when I attempted to fuse it it bubbled through. The first bake must not be carried too far. One who comes to the work from having used a lower fusing body is likely to fall into the error of overbaking the biscuit bake.

DR. N. S. JENKINS:

I wish to ask Dr. Spring if he will have the goodness to collaborate with me when we return to Dresden and help me in some experiments? Perhaps he will be so good as to melt some specimens of high-fusing bodies and let me melt upon them porcelain enamel, that we may present them to the association when we meet next year.

DR. SPRING:

I will do so with great pleasure. I forgot to say that in the beginning if one falls into the error of overbaking the biscuit bake and finds the finished product rough and far from strong, it is a simple matter to grind off the base and go over the work again.

A paper on "A New Phase of the Coagulation Question" was then read by Dr. A. W. Harlan.

DISCUSSION.

DR. E. LAWLEY YORK:

I came prepared to hear a very interesting paper, and I am not disappointed. I only regret that the members have not heard the previous papers which had been read on this subject. Dr. Harlan seems to have spent considerable time in going over his subject, and has given his method of demonstrating that carbolic acid will not penetrate through the dentine of a tooth *in situ*. Dr. Harlan I do not think would willingly misinterpret my original paper, but he has evidently unintentionally misled you. I stated in my previous paper that carbolic acid, to which I solely confined myself, would penetrate through the dentine of a tooth; I never said through the cementum. If Dr. Harlan had removed the cementum and suspended that tooth in water and tested it with bromine water he would have found that carbolic acid was present. I stated that the reason carbolic acid could be used was that it did not penetrate through the cementum, and consequently did not cause any irritation to the tooth. Dr. Harlan's original teaching was that you should never use carbolic acid in cases of putrescent pulp, but in a tooth in which the pulp had been extracted. I demonstrated a long time ago that if you put carbolic acid in the pulp chamber where the pulp has been first extracted, and the pulp chamber could accommodate sufficient carbolic acid, you would cause a coagulum, but the coagulum would be redissolved by the carbolic acid. That is why carbolic acid will penetrate through the teeth, because, if there is sufficient of it, it will redissolve its own coagulum and will penetrate. You would not have to burn or cook any albumen, because there would not be any albumen there. The microöganisms making the albuminous contents of a pulp canal utilize the carbonic acid there in the process of putrefaction, and if the putrefactive stage is carried as far as it can go the products of these microörganisms are not albuminous. There is nothing at all to coagulate, because those microörganisms have destroyed it all. Dr. Harlan's experiments I do not think are conclusive. He has condemned himself by saying that every man has a pet theory and he wants his experiments to come out just so. He has done the very thing he says other men do—he wants it to come out just so. If he had followed out my experiments he would find I stated before the Illinois State Dental Society in 1897 that none of these would penetrate through the pericementum of a tooth. I will, if possible, duplicate Dr. Harlan's experiments, with the exception of removing the cementum from the tooth. If I find the carbolic acid will not go through, then and only then will I say that Dr. Harlan's experiments are conclusive.

Dr. Harlan:

The subject of the use of drugs in teeth is one that was brought to my attention particularly at a very early period, because I considered that the vast majority of dentists at that time were abusing drugs and not using them properly. I began the study of dentistry as early as 1867, and during the next five or six years it seemed as if nearly every one in the treatment of teeth, where they had just destroyed a pulp or where the pulp was already dead, was in the habit of dosing the tooth for the cure of a disease that was at the apex or beyond the apex. That led me to do a little experimenting with reference to the powerful coagulators of albumen. It is a matter of very little moment whether a coagulating drug passes through the dentine or through the substance of the cementum. Some of the enthusiastic supporters of the penetration or diffusion theory of coagulating drugs—not Dr. York—have even gone so far as to say that when they introduced chloride of zinc into a tooth they have trouble because the chloride of zinc almost immediately passes through the sides of the roots and causes the peridental membrane to become irritated. That was simply a figment of the imagination. It may be as Dr. York has said, that if you introduce carbolic acid into a tooth and seal it up and leave it in the mouth for twenty-four, forty-eight or seventy-two hours, take it out and file off the cement, you will get a trace of carbolic acid, but I say that the generally accepted theory that coagulating drugs do pass through the roots of teeth is partially imaginary. The future stability of the teeth depends upon the maintenance of the cementum and peridental membrane in a good state of health. If these coagulating drugs do penetrate they would be doing the very thing to destroy all the teeth they are trying to save. We must not be misled even by laboratory experiments. When you introduce chloride of zinc into a tooth it undergoes transformation. There are various substances that can be infiltrated in the pulp chamber and pulp canal which can absolutely break up and destroy such a settled compound as zinc chloride and zinc sulphite so that it will no longer exist or be capable of recovery. I do not think that chloride of zinc is the best possible agent for filling the roots of teeth. I do not know that I have any pet theory, unless it is to prevent the wrong use of drugs by men who ought to know better, and I do not consider that carbolic acid is the best disinfectant for soft tissues or hard. A disinfectant is an agent that will destroy the infectious power of infectious material in the smallest quantity without change to the tissues.

Dr. Jenkins:

I would like to ask one question. The remark made by Dr. Harlan with regard to oxychloride of zinc is to me entirely novel, and I should like to know if he has ever seen a well-authenticated case of root that has been perfectly filled with oxychloride of zinc where there was any disintegration of the filling afterward? I have never seen one and I should be extremely glad to know of it.

Dr. Harlan:

I never saw the root of a tooth that had been perfectly filled with oxychloride of zinc in the mouth. I have seen some that have been perfectly filled out of the mouth.

Dr. Jenkins:

It is a hundred times easier to do it in the mouth than out.

Dr. York:

I did not mean to say that Dr. Harlan had a pet theory, but I think that in his experiments he would like to see come out of them what he wishes. My experiments have been confined to carbolic acid.

"Modern Advance in Technical Teaching," by Dr. S. H. Guilford.

DISCUSSION.

Dr. Godon:

I am very sorry I did not know that this question was to be discussed this morning, because I am greatly interested in the subject. In our school in Paris we have made this matter of framing the work for our students of the first year one of special study, and we sent to the congress at Munich some specimens of the work of our students. The specimens we wished to show here were unfortunately lost on the journey to Stockholm.

Dr. Aguilar:

If we are working for the benefit not of the American dental profession, but of the dental profession at large, we should be exceedingly proud of the two papers which have been read to the meeting, the excellent address of our worthy president and Dr. Guilford's paper. Both will have great influence upon the teaching of the future dentist. It is the best answer that we could give to the histological school which pretends that it is absolutely necessary that the dentist should be first physician and afterward become a dentist. We have countries in Europe where the student is forced to follow a career of nine, ten or eleven years, as in Italy, and out of those years only one year is devoted to dental matters. That is because the principle set forth by Professor Guilford and Dr. Royce is not realized. The reason why American dentistry is far above European dentistry to-day is due to the fact that the American colleges have not forgotten that the medical teaching of a student must be accompanied by a manual training, and that the manual training is of very great importance. I would urge that the manual teaching of the dentist should begin at as early a period of life as possible. Experiments will show that after a certain age the muscular capacity of the man becomes partially obliterated. Children learn certain things with greater facility than grown-up persons. A child of nine or ten will learn a language in a year, while it takes grown-up people several years to accomplish it.

Dr. Barrett:

I wish to ask whether the work exhibited from the American colleges has been made here? The systems prevailing in Europe and America vary somewhat, each having its own special features. In Europe there is more of the medical teaching, while they depend on the private teacher for instruction in technique. In America it must be all done within the dental school. No instruction that is not given under the direction of the responsible teacher can be given any credit in the final examination of the student. The one course to my mind gives a more thorough and complete comprehension of the principles upon which dentistry is founded, and the other, I believe, gives a better manipulative ability. It is this manipulative ability which we in America have exaggerated. Our principle is something like this, that we would prefer as a dentist a man who is a good dentist and nothing else for practical work rather than a man who was everything except a practical dentist. Both of these sides have their good points, and it is only through a blending of the better qualities of the two systems of education that we can reach that higher plane toward which we are all tending. We have in our National Society of Faculties a wheel within a wheel, a subsociety which is intended for the promotion of all this practical work. It is called the Institute of Dental Pedagogics. That association holds its annual meeting and we have such displays as we have had this morning from very many of the colleges. No didactic or theoretical instruction is brought into account; it is all for the illustration of manipulative ability. That meeting is usually held during the Christmas holidays, and if any of the gentlemen present could attend the meeting they would see that which is so beautifully exaggerated in American instruction perfectly illustrated. Any college that has anything new carries it to that meeting and it is there exhibited. Dr. Guilford's school uses ivory for the carving of teeth; the school with which I am connected uses celluloid.

Another school will represent something else. Therefore we have a kind of competitive exhibition of the work of the different schools. We send our demonstrators there for the express purpose of picking up anything that is new so that we may obtain the benefit of any discoveries which others may have made. We exchange ideas and methods the one with the other, thereby promoting not only professional good fellowship, but raising the general standard of the teaching in all the American colleges. I wish, indeed, that the whole world would come there and exhibit their work with ours, that we might learn from them and perfect our methods of teaching. There is not a school I have ever visited that I did not obtain some new idea from concerning teaching which enabled me to add to the armamentarium of the college with which I am connected. It is this professional good fellowship and fraternal regard amongst teachers of which we are most proud—not that we are better than others. I am sorry whenever I hear an American get up and claim any kind of superiority. If any man claims superiority over others because he is an American he is not a good American. We claim to be your brethren. We claim to be worthy of your fraternal regard, and we will emulate your virtues and try to copy your perfections, and it is in that way that we are striving to elevate the general subject of teaching, and if we can engraft upon our American methods something of that perfect theoretical training which is carried to such a high state of perfection in some of the European schools it will elevate our American schools. That is what we are here for.

CHICAGO DENTAL SOCIETY.

A regular meeting was held in the Schiller Building October 7, 1902, with the president, Dr. Elgin MaWhinney, in the chair.

The subject for the meeting was "Reminiscences of the Recent Meetings at Stockholm, Sweden, of the International Dental Federation and the American Dental Society of Europe."

Dr. Hart J., Goslee was the first speaker, whose preliminary remarks were devoted to the itinerary of the trip.

In referring to the work of the two meetings Dr. Goslee said: There were several splendid papers presented at the meeting of the American Dental Society of Europe. The discussions were particularly good, and some of them even spirited. A spirit of cordiality and genial good fellowship prevailed, in much the same manner as is to be expected where all of the members are American graduates. I do not know that I can do justice to any of the papers that were presented at this society, with the possible exception of the president's address, to which I call your attention and am happy to pay tribute, and would further request that every member of the dental profession read and study it. I understand it will be available to all through the medium of The Dental Review, as all the transactions are to be published therein. It was a splendid exposition of the author's ideas along the line of dental education and an admirable treatise upon the subject in general.

Another very good paper was presented by Dr. N. S. Jenkins of Dresden upon the artistic preservation of the natural teeth with porcelain; and another one upon the subject of bridge work by Dr. L. C. Bryan of Basel, Switzerland. In the latter the author presented some ideas which, while they were not entirely new, were at least somewhat radical, particularly with regard to saddles, and I would suggest that every practitioner interested in the subject of saddle bridges, or the advisability of placing them in the mouth, or applying bridges that rest firmly against the soft tissues, read this paper with care.

While not so enthusiastic as was Dr. Bryan in this particular phase of the subject, I must confess that in his own mouth two bridges, constructed along the lines advocated by him, were serving the purpose with eminent success.

Of other subjects of special importance the one advocated by our host upon that occasion, Dr. Förberg, a most genial gentleman, was presented by his assistant, Dr. A. Jessel, in a paper upon the subject of root filling, in which was advocated the use of carbonized cotton instead of chloro-percha or gutta-percha. The claims that were made by Dr. Jessel and Dr. Förberg were backed up by them vigorously, and every effort was made to present them to the greatest possible advantage. While the subject in general was not of apparent interest at first, it became almost intensely so after it was discussed at some length, and I also call your attention to this paper. I might also mention a paper presented by one of our own members, Dr. A. W. Harlan, along the line of *coagulants,* which carried me back about three or four years and reminded me of an incident in connection with the presentation of a paper upon this same subject at a meeting of the Illinois State Dental Society. This paper was interesting and discussed in a most excellent manner by Dr. E. Lawley York and others.

After a three days' session of this society, during the interim between which we were entertained most royally by banquets, drives about the city, visits to one or two of the old castles and excursions upon the beautiful canals of the Baltic, we attended the meeting of the International Dental Federation. There were present at this meeting many of the most distinguished teachers of dentistry from all parts of the world. The sessions were well attended and exceedingly interesting, and while I was not at all familiar with the methods of doing business which were pursued, and with the real objects of this organization, it was entertaining to me because I was enabled to study the representative teachers of dentistry of Europe and to become well acquainted with many of them. The American dentist is not by any means the only dentist. The gentlemen over there are equally as progressive as we are and on the average are better educated and most of them, I think, are better informed upon dental topics in general than the average teacher in dental colleges in this country. I cannot say much more about this meeting, the proceedings of which will all be published, but in conclusion I must express my appreciation of the royal and cordial hospitality afforded to us by the splendid people of that land. I do not know of a nationality for whom I have greater admiration than the Swedish people.

In speaking of the admirable papers that were read at the meeting of the American Dental Society of Europe I neglected to mention one which was contributed by Dr. J. W. Wassall, of Chicago, and one by Dr. Wm. Mitchell, of London, both of which created considerable interest. They were both admirable contributions and deserved the recognition which they received, and I take this opportunity to include them in my remarks.

DR. A. W. HARLAN:

When I was requested to relate some of my experiences at the meetings in Stockholm I did not know which part of those meetings would be covered by the other speakers this evening; therefore, what I have to say has to be said without any reference to the remarks that have been made by the last speaker or with reference to those that are to be made by Dr. Brophy.

As you all know, this is the first time that any American dental meeting has been held in Sweden. The American Dental Society of Europe has been in existence for twenty-nine years. All of its previous meetings have been held in Switzerland, Germany, Belgium, France and England. It was determined by the executive committee of that society that in consequence of the meeting of the Swedish Dental Society and of the representatives of the advisory boards and of the meeting of the International Dental Federation, that it would be well for the American Dental Society of Europe to convene in Stockholm, the capital of Sweden.

Sweden is a country which the ordinary tourist seldom visits, as it is out of the beaten path of travel. It has a population a little above five million, with an annual increase of about thirty-five thousand, due to the great loss sustained by emigration to other countries. The country of Gustavus Adolphus, who was one of the most enlightened monarchs, has an agreeable climate, although the summers are not long, but the twilight extends into the late evening.

Sweden is a country rich in science, and many of the public squares and gardens in Stockholm are adorned with statues of her scientific sons—Linnæus, Ericcson, Schule (the discoverer of oxygen, hydrofluoric acid and tartaric acid) and the celebrated anatomist Berzelius.

Stockholm is a modern city of about 300,000 inhabitants, although the first dwellers in Stockholm came there as early as the eighth century, but her hostile neighbors repeatedly sacked and destroyed the city of Stockholm and it was ravaged by fire two or thee times in a century for several hundred years, so that the present city of Stockholm dates back about 250 years. It is located on a number of islands and it has been called the Venice of the North. As I have seen the real Italian Venice and the so-called vulgar Venice (Amsterdam) and Stockholm, I am prepared to say that Stockholm is now an attractive modern city.

The way to get to Stockholm is to go to Hamburg, or go direct from London or Hull. In any event, the journey, on account of its length, is apt to be disagreeable, especially across the North Sea, as I spent two days on a little steamer, tossing and tumbling, and kept to my room during the whole journey. The country crossing from Gotenburg by the canal or by rail is picturesque, being intersected by rivers and many lakes, and the people you meet are most charming and hospitable.

The meetings in Stockholm began on Tuesday, August 12, by the holding of a reception on behalf of the Swedish Dental Society welcoming the foreigners from other countries. On Wednesday morning, the 13th, the American Dental Society of Europe opened with about 100 members present, and there were from twenty-five to fifty visitors from different parts of England, the United States, Canada, Australia and even as far south as Naples.

The program was most interesting, and in addition to the papers mentioned by Dr. Goslee there was one by Dr. B. Holly Smith, of Baltimore, on the status of dentistry, contrasting it with its status twenty and thirty and fifty years ago, showing its gradual but certain development, and also fixing its place as a profession in the public mind. This was a most interesting paper and was discussed by many of the gentlemen from abroad and also those resident in the Scandinavian countries.

Quite a number of papers were read during the two succeeding days by Drs. W. A. Spring, A. W. Harlan, S. H. Guilford, Truman W. Brophy, Wm. Mitchell, L. C. Bryan and C. F. W. Bödecker. One could not help but be reminded of the meetings held in the United States when so many well-known names appeared on the program in far off Stockholm, and all of the discussions practically took place in English, as nearly all the members of the American Dental Society in Europe speak English and most of the members of the Swedish society likewise. There were only a few who spoke in their native tongue—French or German—but as these speeches were translated into English, it made a very interesting meeting.

Every day there was a luncheon for some of the foreign members and every evening there was a dinner or a reception and the ladies were taken on excursions through the canals and to visit the various islands about Stockholm.

This lasted the whole week, and on Sunday a boat load of visitors and natives were taken to the Chateau Gripsholm, one of the most interesting castles round about Stockholm.

On Saturday there were many clinics given, mostly by Americans from the United States or Americans who are residing in some part of Europe. There is one dental school in Sweden.

The work of the International Dental Federation, which followed that of the American Dental Society of Europe, and the work of the advisory boards I will leave to Dr. Brophy, who is to follow me.

Dr. Truman W. Brophy:

In Copenhagen we visited the first dental college we had an opportunity of seeing on the other side of the water. It was organized in 1894. It is not a large school, but a very well equipped one, with an enthusiastic man at its head. They are doing everything they can to thoroughly educate their students and I am satisfied they are earnest workers and that the students are receiving good instruction. They are trained, so far as physiology, etc., are concerned, in the school of medicine, but their practical work is done in the school of dentistry which we visited. The school is well equipped with Morrison chairs, various lathes and furnaces, etc., necessary for teaching the practical side of dentistry.

Stockholm has one of the finest hospitals in the world, capable of accommodating from twenty-five hundred to three thousand patients.

The Scandinavian Dental Society (Svenska Tandalakare Salskapet) includes Sweden, Norway, Denmark and Finland. In Sweden there are about four hundred dentists, one hundred of whom reside in Stockholm.

Very much to the credit of the Swedish dentists, 80 per cent of them are members of the national society. In Sweden there is a dental school which is doing excellent work. Finland has about one hundred dentists. Our short stay in Helsingsfors, its capital, gave us an opportunity to get a little insight as to the habits and customs of the people whose beautiful city is a monument to their good taste and architectural skill.

There is no dental school in Finland. We found among the countries visited dental schools as follows: Russia has five, though about five times the area of the United States. St. Petersburg one, Odessa one, Warsaw one and Moscow two. Austria has two dental schools, Vienna one and Budapest one. Germany has two dental schools, Berlin one and Leipsic one.

Before speaking of the work done by the International Dental Federation I would like to say a word or two with reference to the American Dental Society of Europe.

One who is given to studying character and forming estimates of the ability of men would be deeply impressed in a meeting of the American Dental Society of Europe. I think it is safe to say that every member of the American Dental Society of Europe is a man of great strength of character. He is a marked man. He has special characteristics which raise him above the average man. There is some particular thing in which he excels. He has had the ability to go among the people of a foreign country, in many instances unfamiliar with their language, and has succeeded and won not only for himself the success that every one strives for, but he has won for his native country a good name, so that the better element of the dental profession as well as the people of Europe generally respect the educated American dentist. They respect him because he is a gentleman: He is a skillful man. He is a generous man and he is appreciated.

The American Dental Society of Europe extended an invitation to the dental profession of the world to join in the deliberations at Stockholm, but one of the American dental journals changed the wording of the invitation so as to have it read, "The profession of America are invited to meet with us in Stockholm." It was not pleasant for the society, because their invitation was general and they invited dentists from all over the world, and not those of America alone. Some of the representatives of the countries of Europe, seeing this notice, felt they were not invited, and no doubt some consequently remained away. It hurt the feelings of the officers of the American Dental Society of Europe when that notice appeared.

The International Dental Federation accomplished a great deal of good this year. When the International Commission of Education got down to business the first question which was considered was this: "What should be the preliminary requirements of dental students before beginning professional studies?" Some gentlemen proposed that these requirements be the same as those in medicine and law. I objected to that, and I may say that I stood alone in that meeting one forenoon in objecting to the answer to that question. Finally a committee of six was appointed to take the question up and answer it. The committee came back with the same answer, that the requirements for admission to professional schools should be the same as for the admission to schools of law and of medicine. I objected to that because the question was not answered. It would be answered in countries in which the requirements for admission to schools were regulated by the government, but not in countries like ours and some other countries, where the requirements for admission to professional schools are not regulated by the government, consequently the question was not answered. This was not a meeting of a dozen nations of Europe, but a meeting which was represented by seventeen nations, a meeting which the world was interested in. The discussion of this question occupied the whole forenoon. It was finally decided to postpone further consideration of the subject until the next regular meeting, which will convene in Madrid in the latter part of April next.

The second question was taken up, also a third question, and these were satisfactorily settled. These questions I will read. The first question I declared was one that we ought to settle before adjournment, so the committee was enlarged and again took the question up and satisfactorily answered it. The transactions of the meeting have appeared in a French dental journal just received, and Dr. Harlan will read the answer to this question, which was finally adopted.

Question 1. What should the preliminary requirements of dental students be for entering upon professional study?

A. The same that are required of students of medicine or of law in the countries where those subjects are under the control of the State, or an equivalent shall be required in those countries where such control does not exist, and this equivalent is to be determined by the minister of public instruction.

Dr. Harlan:

I might say, in commenting on this, it is required that a man shall be a Bachelor of Science, a Bachelor of Philosophy or a Bachelor of Letters. In France, in Spain, in Italy and in all the Latin countries in Germany he must be a graduate or must have passed through the Real Schule, which is equivalent to the degree of Bachelor of Science or Bachelor of Letters. In England or Great Britain it is the equivalent of the entrance examination to the London University and to the teaching bodies of Oxford and Cambridge.

Dr. Brophy:

So the question was answered in a way not to legislate for two or a dozen countries, but for the world. It is an expression of opinion of the Federation as to what the standard should be, and it is hoped by all who are interested in the cause of dental education that this standard will be reached at the earliest opportunity. It seems to me that if we had done nothing else at that meeting in Stockholm than to fix the standard of preliminary education for admission to our professional schools our work would have been highly satisfactory.

Question 2. What should be the nature of dental studies, their length and consecutive order?

Dr. Brophy:

This question was discussed for some time and finally adjusted. The general opinion of the commission was that four years' work should be practical; that the fourth year in college should be like the work of an interne in a hospital, who has completed his studies, who has passed an examination in all practical branches and is placed in the college with a view of taking some special work in order to better equip himself for his life's work, devoting his time almost exclusively to practical matters, so that he may become a well-equipped practitioner before taking upon himself the responsibilities of practice.

A. The dental study should comprise a scientific part, a medical part and technical part; the duration should be at least four years. Studies should be organized according to a method that will parallel all of the courses; that is to say, scientific teaching, medical and technical teaching, simultaneously. Graduates in medicine desiring to practice dentistry should be required to follow these studies at least during the last two years in a dental school.

Dr. Brophy:

This was adopted almost unanimously.

Question 3. What part of the course given in medical schools should be followed by the dental student?

A. The scientific and medical studies that should be followed by dental students are as follows: Physics, chemistry, metallurgy, anatomy, histology and embryology, physiology, biological chemistry, bacteriology, general pathology, general surgery, therapeutics and materia medica, differential diagnosis, special surgery, comprising anesthesia.

Dr. Brophy:

Those are the three questions proposed a year ago at Cambridge and acted upon this year at Stockholm.

Besides a great deal of other matter came up for consideration, which was freely discussed, bearing upon educational subjects.

I have very little knowledge of what was done in the department of hygiene. I was unable to attend the sessions of that department, being engrossed with other work. But the work of the International Dental Federation, everything considered, was highly satisfactory, and especially that part which bears upon the preliminary requirements or training.

Professor Hesse, of Leipsic, an earnest and enthusiastic worker, said that the preliminary requirements for admission to dental schools in some countries were not as high as the requirements for admission to schools of medicine and law, and this distinguished gentleman argued that the requirements should be made the same as in medicine, and justly so. The dentist is looked upon in some countries as a man who can succeed with much less general information than the physician, and consequently he urged that these requirements be the same as in medicine. Professor Hesse, after a whole evening's discussion, terminating as happily as it did by acting on and settling all three questions, making it highly satisfactory to every one, came to me and very frankly said that he was glad I took the position I did, because it had enabled them to create a standard which would fit every country in the world.

One word in regard to the presidential address of the American Dental Society of Europe. I believe the address of Dr. Royce at the meeting in Stockholm, as president of that society, is the most complete, the most logical, leading us along by a process of evolution from the very rudiments of thought in an educational way up to the standard of dental perfection in the way of education that I have ever heard. In fact, I believe the address of Dr. Royce will stand as a classic in the literature of our profession and I hope that each and every one in this society will read his address carefully from beginning to end when it is published. While at the outset it is foreign to the subject of dental education, it deals with the subject of general education something after the fashion it was treated by Sir Michael Foster a year ago at Cambridge, with reference to training young men not only mentally, but training their minds so that they may use their hands, showing that hand training is by no means inferior to mental training. It is only through mental training that hand training can be perfected. When you read that address you will feel that the dental profession has in it men who are capable of producing addresses of the very highest order upon the subject of general as well as special education.

ODONTOGRAPHIC SOCIETY.

Monday, May 19, 1902.

PRESENTATION OF CASES FROM ORAL SURGERY CLINIC OF DR. THOMAS L. GILMER.

By Arthur D. Black, M. D., D. D. S.

Mr. President and Gentlemen—The cases that I will present this evening were selected from the oral surgery clinic of Dr. Thomas L. Gilmer at Northwestern University Dental School. The histories of these cases, of which I will give you only a brief outline, are copied from the records of the clinic, which are kept by the students. When the first examination of a case is made the student to whom the patient has been assigned records the previous history and findings of the examination. After operation the student is required to record what has been done and afterward from week to week to make memoranda of his own treatment of the case, with its progress. An examination of these history sheets, which will be passed around, will give a good idea of the method of keeping the records. You will have an opportunity to examine the patients a little later in the evening.

Case 1. Necrosis of Lower Jaw. Man, age 46, German, presented at clinic Oct. 25, 1901. Family history good. Personal history, Bright's disease at age of 22, neuralgia in head ten years ago, rheumatism in legs occasionally, otherwise healthy. Present trouble began in January, 1901, by discharge of very foul pus between gum and one of the lower left bicuspid teeth, accompanied by swelling of the face and pain. After several months' treatment by a dentist tooth was extracted. There was a gradual extension of the disease and the remaining bicuspid and the molars were also extracted. On August 15, 1901, patient placed himself in care of a physician. At this time an abscess was pointing externally below the position of the second molar. An incision was made and about a teaspoonful of pus obtained. This was followed by daily irrigation and dressing, but the discharge of pus continued and an examination revealed the presence of necrosed bone. On September 22, 1901, physician operated, making incisions along alveolar ridge and externally at lower margin of jaw, and a sequestrum about ¾x½x½ inches was removed through the inner incision. Wound was irrigated and dressed daily, but discharge of pus continued, and on October 25, 1901, physician presented with patient at the clinic.

Patient was at that time somewhat anemic, showing lack of nutrition. There was considerable swelling and induration of left side of face and neck, and there was a discharge of foul pus from an opening at the lower margin of the jaw, also into the mouth. The gum was red and swollen. A probe could be passed from outer opening through into the mouth. On the buccal aspect of the bone an area of necrosis about ¾x2 inches could be made out. This extended from the angle of the jaw forward to the position of the first bicuspid. No loose bone could be discovered, but the condition seemed to be spreading without any tendency to the formation of a sequestrum, and Dr. Gilmer therefore decided to operate at once, contrary to the general rule.

Under anesthetic external opening was enlarged to extend along lower margin of jaw from notch of facial artery to position of first bicuspid. Flap was dissected upward, the facial artery being ligated and cut. What remained of the outer plate of bone in the area involved was removed with a flame-shaped bur 5 mm. in diameter. The inferior dental canal was exposed for about one inch, but nerve and vessels were not disturbed. Rubber drainage tube was placed in wound with ends protruding at ends of incision. Central portion of wound was sutured over tube and external dressing applied.

Subsequent treatment consisted of daily irrigation with boracic acid cassia water* and new dressing. Drainage tube was removed on November 15, at which time the internal wound had healed and the external wound had progressed favorably, except for a slight discharge of pus, which continued up to January 10, 1902, when the remaining opening was enlarged and an irregular piece of necrosed bone about one-fourth inch in diameter was removed. This wound then healed rapidly.

Case 2. Caries of Upper Jaw. Man, age 68, Swede, presented at clinic February 14, 1902. Family history good. Personal history, always strong and healthy. History of present illness: Two years ago abscess of upper left lateral incisor, which was treated and tooth filled. Tooth was refilled in May, 1901. Ten days ago filling was removed and root canal found to be unfilled. Considerable pus discharged through root canal. The tooth was extracted. For the past six weeks patient has complained of pain in the superior maxillary region. This pain was more or less constant, with occasionally a sharp pain.

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*One drop of oil of cassia to two ounces of saturated solution of boracic acid. This solution was used for irrigation in all of the cases reported, unless otherwise stated.

Examination revealed the following: A probe passed into socket of lateral penetrated a large cavity in the bone extending upward and backward about one and one-half inches from the gingivæ. A sharp steel probe revealed some small areas of necrosed bone in a field of carious bone. There was also an opening through the socket of the third molar on the same side which connected with the antrum. (Patient stated that this tooth was extracted ten years before.) Gum was very tender over entire area of left upper jaw.

Under anesthetic upper left cuspid, bicuspids and molars were extracted. With alveolar forceps, alveolus of same region was removed, also a portion of the palatine process of the superior maxilla and the floor of the antrum. Entire wound was curetted, irrigated and packed with iodoform gauze.

Subsequent treatment has been daily irrigation and iodoform gauze packing for first few weeks, and after that irrigation only. On several occasions growths of polyps have appeared in the wound, most of which were attached to the inner wall of the antrum. These were curretted and gradually appeared less often. At the present time the wound is slowly healing. Patient has a large bulb syringe and is irrigating the wound himself after each meal. Complains of slight amount of pain occasionally.

Case 3. Caries of Upper Jaw. Man, age 31, American, presented at clinic March 14, 1902. History: Four years ago upper right lateral was devitalized and a Logan crown set. Immediately afterward a severe abscess developed. This was lanced by a physician and afterward treated and the crown reset. Patient has had neuralgic pains in right side of face occasionally during past four years. Six days ago face began to swell and there was pain in the infra-orbital region. Next day crown was removed and root treated. Swelling has continued since that time. Examination with a sharp probe indicated considerable carious bone around end of root.

Under local anesthetic, injection of cocaine, morphine and atropin, an incision one-half inch long was made at right angles to long axis of tooth, exposing end of root, the process about the end of the root having been destroyed. A hole was drilled through root and the end severed with a cross-cut fissure bur, cutting to the mesial and distal from the hole previously drilled. About a teaspoonful of pus was discharged. A large cavity, the bony margins of which were carious, extended upward and backward about one and one-fourth inches. This cavity was curretted, irrigated and packed with iodoform gauze.

Subsequent treatment has consisted of daily irrigation with boracic acid, cassia water and gauze packing. Pyrozone was also used for a few days. After ten days there was still a slight discharge and during the next week aromatic sulphuric acid was applied for ten minutes every other day. The discharge has gradually subsided and the wound appears to be healing nicely.

Case 4. Caries of Lower Jaw. Man, age 40, Canadian. Presented at clinic March 14, 1902. History: About February 1 noticed swelling of lower jaw on left side and about chin, and a few days later pus began to be discharged about the necks of the teeth in the same region. About a week ago a more prominent swelling appeared externally at the lower border of the jaw in the region of the cuspid. This swelling has gradually enlarged during the week, but without any discharge. There has been little pain. Patient's principal complaint is of the foul pus discharged into the mouth. This discharge was very profuse, by pressing on the gum with the fingers several teaspoonfuls could be forced out. Patient's general health was good. He had been at work regularly. The teeth of the lower left side were all very loose. These teeth were lifted out. The alveolar process and a portion of the bone had been destroyed. No sequestrum was present. The exposed surface of the bone was curretted, cavity irrigated and packed with iodoform gauze. A week later the abscess on the chin was opened and considerable pus obtained. Daily irrigations and dressings were ordered and the wound healed promptly.

Case 5. Empyema of Antrum. Man, age 50, American. Presented at clinic December 6, 1901. History: One year ago complained of pain in left side of upper jaw in region of second molar. There was at that time also pain and tenderness in region of left antrum, accompanied by discharge of foul pus through the nose, for about one week following a severe cold. A small abscess formed to the lingual of the second molar. It was opened several times during the past year and each time a little pus was obtained. There has been a constant slight discharge of pus through the nose. This was not offensive. Patient has had a cold during past ten days, with considerable pain about left eye.

Exploration of sinus revealed no connection with antrum. Patient was referred to Dr. W. E. Casselbury, Northwestern University Medical School, for examination. Dr. Casselbury reported examination by transillumination and aspiration, revealing a thickened condition of the mucous membrane and presence of pus in the antrum, no nasal polypi, nor any other pathological condition in the nasal passages except a slight thickening of the mucous membrane around the osteum maxillare on the left side.

Operation December 20, 1901. Under general anesthetic incision three-fourths inch long high up above molar roots, periosteum elevated, antrum penetrated with a 2.5 mm. drill and opening enlarged with 5 mm. flame-shaped bur to admit finger. Entire antral cavity curretted, thickened mucous membrane and granulation tissue being removed. First and second molars and second bicuspid were extracted (first bicuspid and third molar had been extracted previously). Wound irrigated with Theirsch* solution and packed with iodoform gauze.

Subsequent treatment consisted of irrigations and packing. Packing was discontinued after a few days and patient was allowed to care for wound himself, being instructed to irrigate cavity daily. He is making an excellent recovery, there being at this time an opening not more than one-eighth inch in diameter.

Case 6. Fracture of Lower Jaw. Man, age 47, German. Presented on November 26, 1901. History: Ten days ago patient was hit on the right side of the lower jaw with a brick and has been under care of a physician until to-day. Has been unable to eat any but soft foods and complains of considerable pain about angle of jaw. There was considerable swelling and discoloration in this region, but no external wound. The lower right third molar pressed against the gum of the upper jaw when patient attempted to close mouth (upper right third molar missing). Patient could not touch edges of upper and lower incisors by nearly half an inch. Examination revealed a fracture of the jaw transversely between the second and third molars. Soft tissues within the mouth in this region were swollen and red.

The lower third molar was extracted and the teeth of the lower jaw were wired to those of the upper, obtaining normal occlusion and fixing the lower jaw in that position. Subsequent treatment consisted of daily irrigation and scrubbing of the teeth and gums. An abscess developed in the region of the fracture, which was opened, both from within the mouth and externally, and for several weeks a gauze drain was drawn through from the outer opening to the inside of the mouth daily. A small fragment of necrosed bone finally came away. On January 8, 1902, the gauze was discontinued and the wound healed rapidly, leaving practically no scar. On February 7 the wires were removed from the teeth and the patient discharged, the occlusion being exactly normal.

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*Theirsch solution: Boracic acid, 12 parts, salycilic acid, 4 parts, to 1,000 parts of water.

EXHIBIT OF SURGICAL CASES AND NOVEL METHODS.

By Dr. C. P. Pruyn.

Especially interesting surgical cases that I expected to bring you have disappointed me. I have only one case, which is hardly a surgical case, and still a case such as we sometimes have, a case of an upper molar where I amputated the palatal root. I dissected this root away and the tooth is now doing good service, standing on the two buccal roots. In the same mouth on the lower jaw I have a plate that is a little interesting—a plate made of Weston's metal, making it very heavy because of an accident that the patient received some years before. The entire alveolus had been destroyed. I attached the teeth with rubber and then on the outer surface, the surface that presented to the cheek corresponding with the surface from the cuspid to the second molar I have a shelf which projects out into the cheek, and this aids considerably in holding the plate in position. This method I have used in quite a number of cases where the alveolar ridge is nearly gone, where we have a perfectly flat lower jaw, and it helps very much in the retention of such cases. When the time comes for exhibition I have the patient here.

I had another interesting case that I operated on Friday, a case of empyema of the antrum that had been going on evidently for at least six years, and for the past three years a silver tube has been worn in the nose projecting into the antrum, but the patient does not know it. I have the tube here. The tube passed backward on the floor of the nares instead of projecting into the antrum. So after having worn this silver tube in that mal-posed position for three years, I removed it. Then in connection with the case was a diseased condition of the second molar, to which was attached a small bridge. The roots of the molar were diseased. Whether the molar was the original cause of the empyema of the antrum or not I do not know. We extracted the molar and made an opening into the antrum, and now we have a tube in and are washing it out.

I will recite another case, a case that presented at the last clinic of the Illinois Dental School, a case of compound fracture of the mandible of five and a half weeks' standing; ends of the bone exposed and large amount of pus being generated. In this case we resorted to the method just explained by Dr. Black. We put wire upon the teeth above and below, and then after the wires were in place we had that extreme amount of induration which rendered it impossible to get occlusion. For a period of half an hour we applied very hot compresses and after half an hour's time we softened up that induration very considerably, so that during the period of another half hour, by using traction, we were able to draw the parts and get them in very fair apposition and wired the jaws together. In this case it was necessary to currette the ends of the bone that were exposed, and I did it without an anesthetic, for the reason that I dislike very much to give an anesthetic in such a case and then have the subsequent nausea which would probably result and in that way strain the wire ligatures. This case healed very nicely and after about three weeks the wires were removed.

SHOWING RESULTS OF AN OPERATION UPON ANTRUM FROM WHICH A CYST AND POLYP WERE REMOVED.

By Dr. C. E. Bentley.

The objects in exhibiting this case are two—one is the exceedingly large polyp which was removed from the antrum, and the other is the remarkably short time it took to heal this antrum, in spite of the large amount of cutting and with a small amount of disfiguration. The patient reported to me in June, 1901, as having been a sufferer in the region of the antrum for a year. His dentist had lanced what was supposed to be an alveolar abscess in the region of the second bicuspid. This lancing relieved the patient temporarily, from which large quantities of pus flowed. He finally went to his physician and his physician, suspecting that there was antral trouble, recommended the patient to me for a confirmation of his suspicions. There were none of the physical signs of antrum trouble that we commonly look for, other than that there was tenderness in the region of the antrum and that there was a recurrent filling of pus sac in the region of the second bicuspid. Quite contrary to what I usually do in such cases, knowing that transillumination is an uncertain test, I plunged an exploratory bistury, with a syringe on the other end, through the middle meatus of the nose into the antrum and drew therefrom clots of pus, not saneous pus or pus in the laudible form, but clots of pus. And then we decided upon an operation. The patient was etherized on Sunday morning and I entered the antrum posterior to the canine fossa. Exploring with a probe, I found a yielding substance. I cut away almost the entire maxillary plate of the antrum and exposed the contents to full view. There was a cyst, the contents of which represented an amber-colored fluid that immediately collapsed after being punctured, but a very large polyp was clinging to the posterior wall of the antrum. I dislodged the polyp and I have brought it here this evening for your inspection. It is one of the largest I have ever seen. This case was curretted and kept open with boracic acid gauze from June 8 to June 17. There had been little or no pus after the operation and the case healed in a remarkably short time; I think something like two weeks after the gauze was removed the case healed up. There was a marked disfiguration interiorly after the operation, but the patient is here this evening, and when the time comes for such an exhibition I want to show you what slight disfiguration has resulted exteriorly. Treatment was purely aseptic; that is to say that it was washed out with carbolized water, and in some instances salt and water, and the patient did none of the treatment himself, but came to me for treatment. He was accessible and I had him come up every day for a while, and shortly after twice a week. The only prominent feature in connection with this case is the large polyp that was inclosed and the speedy recovery of the case.

EXHIBIT OF MODELS SHOWING THE INJUDICIOUS EXTRACTION OF THE PERMANENT TEETH.

By Dr. C. S. Case.

When Dr. Bentley invited me to do something before this society in the way of a table clinic, as I understood it, I told him that I should be very glad to do so. I was not decided at that time what I should exhibit, but later when he sent word to me to give the title of my clinic it occurred to me that the subject of the injudicious extraction of the permanent teeth might be of some benefit, and so I selected a few of a large number of cases to illustrate this point. The first one is that of a young man twenty-two or three years of age, who presented about a year and a half ago with an apparent retrusion of the upper jaw, or what appeared to be a protrusion of the lower. By examining his teeth very carefully I discovered that he had lost a second molar. It would seem very strange that the loss of a second molar would have so much influence upon the position of the entire teeth, but probably the occlusion was such that any slight influence would tend to deflect the upper back of its proper position. The incisor teeth might have occluded evenly with each other at that time, or possibly slightly in front. This extraction of the second molar allowed the teeth to drift around upon that side, as you will see by the models, and the occlusion of the upper teeth is back of the lower. In the correction of this case I have opened the space upon that side sufficiently to insert an artificial bicuspid in order to bring the anterior upper teeth in front of the lower. The face of this patient, which I now show, will illustrate the dangers which might sometimes arise from the extraction of a single tooth in the upper jaw in a case where it was already retruded. The question often arises as to whether we shall extract or not. It seems to me that a careful study of faces should indicate the dangers of extracting teeth in either jaw. If it tended to be a retruded upper, certainly you would not extract teeth from a jaw that was already retruded. You would use every effort to save the teeth in that jaw.

The next is a model of a young man about twenty years of age, showing the effect of extracting the first lower left molar, allowing the teeth to drift around and back upon that side, increasing what was already a retruded lower arch. The effect of this case was that of a protruded upper because the upper teeth were so far in front of the lower, but in reality the central incisors alone were protruded, while the lower teeth were retruded. By expanding the upper arch slightly and allowing the centrals to drop into their alignment between the lateral incisors, which were about in the proper position, the upper was very readily corrected. It was necessary to protrude the lower teeth on the side on which the molar had been extracted. You will see that while this case is not finished, the protrusion of the bicuspid and the cuspid tooth has been accomplished, leaving a wide space for the insertion of an artificial bicuspid or small molar to take the place of the molar that had been extracted. From now on the incisors will be protruded so as to fill out the area along the lower lip and in that way correct the deformity.

I have here another case which will illustrate very perfectly the effect of the injudicious extraction of lateral incisors to permit the eruption of retarded cuspids. More frequently dentists are inclined to extract the first bicuspids in young people when the cuspids are retarded in their eruption on account of lack of room. Whereas, if they would permit the developing influences of growth to proceed the case would correct itself. In this case the lateral incisor had been extracted, no doubt to permit the eruption of the cuspid, with the result that the uppers very early commenced occluding back of the lowers, producing the effect of a protruded lower jaw. In operating on this case the upper teeth were protruded and wide space made for the introduction of artificial teeth. I have here a tintype that the young lady gave me when she came, and also a photograph which shows the harmonious relation of the features of her face after the case was finished.

Here are the models of a young girl who was brought to me by a dentist who had extracted the first bicuspids in order to permit the eruption of the cuspids, with the result that the upper very early occluded back of the lower, with a lack of development of the features of the face. In the finished case will be seen the models of the mouth with the spaces opened for the introduction of artificial bicuspids in order to hold the arch in position.

Here is a case that was sent to me from Ohio a few years ago, the dentist saying that he saw the upper teeth were so very irregular he knew it would be impossible for me to correct them unless certain teeth were extracted. The upper teeth are certainly very irregular, but it is always possible to bring the teeth into alignment and enlarge the arch if necessary. I brought this to illustrate what a dentist will sometimes do without thought. By looking at this face you will see that there is already a retruded upper, and to think of extracting any of the upper teeth under those circumstances would seem to any ordinary dentist perfectly absurd.

METHOD OF PREPARING FACINGS FOR POSTERIOR BRIDGES.

By Dr. J. S. Bridges.

I have here a method of preparing facings that perhaps some of you have seen. I prefer a facing for a bicuspid that is a little longer than we usually select, and I cut on the occlusal surface a step or flat seat, and into this seat and along the back of the facing I burnish 120 foil, and then on the foil I place a piece of ordinary backing. After I have swaged up a cusp of about 30 gauge gold it is all waxed together and invested as I have here. This method of backing takes the strain away from the pins and allows the gold to be of great strength at the weakest point, producing a finished tooth that shows no gold at all.

SPECIMEN SHOWING DECAY OF ANTERIOR BUCCAL ROOT ABOVE CROWN CAUSING PERSISTENT NEURALGIA OF THE FIFTH NERVE.

By James E. Keefe.

About two months ago a gentleman presented himself to me to have his teeth examined. His wife accompanied him, and called me to one side and told me that he was in a very nervous condition (which was apparent), and had been a long sufferer from a disease which a doctor diagnosed as tic douloureux. Upon examination I found his teeth and mouth in good condition and immediately inquired about the nature and duration of his pains, etc., and obtained the following history: He has had severe trouble on the left side of the head and face for the past two years. The pains would start at any time, and under all climatic conditions, sometimes lasting an hour and other times continuing all day and night. When this trouble first came on, the pains were not so severe and he attributed them to a fall which he had from his horse. He consulted his dentist, and after a careful examination the dentist told him that the trouble was not from his teeth. Later he consulted a neurologist, who diagnosed his case as tic douloureux and put him under treatment, assuring him he would probably be relieved in a short time. The pain continuing, he left Chicago to consult a physician in New York. The New York physician agreed that it was a case of tic douloureux and also prescribed for him, having him under his treatment for several weeks, from which he found no relief.

His wife persuaded him to go abroad. They went to London and consulted a neurologist there. After the consultation the doctor referred him to a dentist. Upon examination of his teeth, the dentist reported that they were in perfect condition and referred him back to the neurologist. He stayed under treatment in London for about four months, and while there consulted two neurologists, but did not receive any relief from either of them. Giving up in despair, he concluded to return home, and while aboard ship he was kept quiet by the use of opiates administered by the boat physician. The pain continued with more or less severity ever since, up to the time I saw him. I then concluded to make a more thorough examination, to be sure that the teeth were not the cause of his suffering. I took a fine probe and explored above the gum margin on the necks of all the teeth on the left side of his mouth. When examining the upper left third molar on which there was a crown which supported a bridge extending from the second bicuspid, about one-quarter of an inch above the crown on the anterior surface, my probe fell into a cavity and he immediately exclaimed, "There it is." He put his hands over his temple and certainly was in great agony. I filled the syringe with water, put it around the teeth so as to be sure of my discovery, and again he had a shock almost as severe as the first one. Jumping out of my chair, he exclaimed he would not stand any more such treatment, but after some persuasion I induced him to sit down again, telling him I would use warmer water this time, and assured him it would not hurt him. I then syringed out the cavity, getting the point of the syringe well under the gums, and he got some relief from the application of the warm water. I told him that I thought we would have no trouble curing his tic douloureux by treatments, but first the bridge would have to be removed and the tooth extracted. This he objected to for a time, saying that he was tired of treatments and suggestions from doctors and dentists, but after a little he submitted and permitted me to remove the bridge. After slitting the crown on the bicuspid tooth, I found that the molar was not as tight in its socket as it appeared to be when the bridge was held by the bicuspid tooth.

I removed the tooth, the bridge coming away with it, and on the anterior surface on the buccal root I found a large cavity with the pulp exposed, which I here present for your inspection. I was satisfied in my mind that we had found the cause for his long suffering. While he sat in the chair, somewhat nervous from the extraction of the tooth, I talked with his wife, who was sitting in another room, and told her what I had found, and she, of course, was skeptical as to the ultimate result, but not as much so as he was. I immediately concluded that it would be necessary to do more for him than the simple extraction of this tooth to relieve the mental effects which the long suffering had brought on.

I sent my assistant to the druggist to get me four ounces of castor oil; to this I mixed one teaspoonful of quinine. I gave him this bottle, instructing him to take one teaspoonful three times a day, assuring him that in a very short time his pain would cease under this treatment. He inquired about the contents of the bottle. I told him it was castor oil and some other medicine. He informed me that he had taken castor oil before and received no relief. I told him the drugs that were with the castor oil were the missing link necessary to complete the cure. He took a teaspoonful while in my office and he said it was a little more bitter than anything he had taken before. I kept him under this treatment for about a month, and when he got used to it, I added one teaspoonful of bicarbonate soda to the four ounces of castor oil and quinine. He has been on this last dose for about a month now, and on both doses for two months. I will stop the medicine this week. He is, of course, entirely cured mentally, and in reality he has been cured since the extraction of the tooth. The only time he complained of any pain was after the tooth was extracted. For a day or two after the extraction, he complained of a little soreness and what he called imitation pains, and now they have all disappeared and he is very much improved in general health, and to use his own language he is a man again and thinks life worth living.

DESCRIBING THE CREATION OF THE INTERPROXIMAL SPACE BY SURGICAL MEANS.

By Dr. J. E. Nyman.

I supposed that I was going to present something which was original, but in discussing the matter with a practitioner the other day he told me that he had operated in that manner half a dozen times. The case was this: A gentleman of about thirty-five presented himself to me, complaining of a great deal of discomfort in the region between the lower right first molar and second bicuspid. Upon examination I found two amalgam fillings which had no contour whatever, and there was contact from a point a millimeter above the gum to as far down below the gum as I was able to run a probe. There had been a complete obliteration of the interproximal space. This condition had probably been aggravated by the late eruption of a third molar. There was no way in which those teeth could be separated. The presence of the third molar abutting against the ramus of the jaw precluded a movement in that direction. The cuspid occluded in such a manner that it was practically impossible to obtain any movement of the teeth anteriorly. Both teeth were in a state which made it evident that they must be crowned. Of course it would not do to crown the teeth with that interproximal condition. So I concluded to establish an interproximal space. I injected the interproximal region very extensively with a one-fifth of one grain cocaine solution; afterward I took a steel instrument the diameter of one millimeter and forced it through between the roots of those teeth at a point about three millimeters below the gum margin—i. e., I went down to a point to where I could find a space between the roots. Then with a small fissure bur I cut through between the teeth, being careful not to sever the gum septum at the buccal and lingual aspect. This bur was followed by another of larger diameter until finally I had a space in there of about one and a half millimeters. Each time I carried down the bur until I touched the steel instrument. After this had been accomplished, the cavity was thoroughly washed out and a shelf cut in both the molar and bicuspid and a piece of 26-gauge platinum was laid across and gutta-percha packed on top of it. The patient was instructed to wash the cavity out carefully after each meal with a solution of boracic acid and salt and water. The case made an uneventual recovery and there was a gum septum formed in there, and after waiting for a period of about two months I crowned both teeth. That occurred about four years ago. I saw the patient less than a year ago and that interproximal tissue was in perfect condition, so far as could be detected, and he assured me that it had never given any trouble. Since operating on that case I have had one more, where the conditions were identical, and in the same locality. That case I operated upon about two years ago. I have not seen it for over a year, but the last time I saw it everything was in a healthy condition.

DISCUSSION.

Dr. J. E. Nyman:

In some of the reports of Dr. Gilmer's cases mention was made of the use of iodoform gauze. I would like to know why iodoform was used? It has been demonstrated time and again that its antiseptic power is practically nil, and furthermore, iodoform very often has a toxic effect on the tissue.

Dr. T. L. Gilmer:

You mean systemic toxic effect, not on the tissue.

Dr. Nyman:

Sometimes a local toxic effect also.

Dr. C. P. Pruyn:

Speaking of iodoform, I see no advantage in using iodoform in the mouth, but a great many disadvantages. If I was a patient I would dislike very much to go around advertising to the world that I was having iodoform used. I think you get all the advantages from aristol that you do from iodoform. The only objection to aristol is that it costs a little more, but for dental use such a small amount is needed that the expense cuts a very small figure indeed.

Dr. C. E. Bentley:

I want to say, in connection with iodoform, that I agree with Dr. Nyman. I cannot see the necessity of using iodoform gauze in wounds of the mouth. Aristol may be very good, but if we desire to use a gauze I think that boracic acid gauze answers all of the purposes and has none of the disadvantages of iodoform.

Dr. J. N. Crouse:

I have been wondering what proportion of these cases would have gotten well without a surgical operation. During my thirty-five years of practice I have had a number of various forms of diseased antrum, but have never found one which required an operation, being able in all cases to heal them up. Consequently, I would utter a word of caution against this wholesale surgery, for I have never seen a diseased antrum that would not get well with careful treatment.

Dr. C. E. Bentley:

I want to endorse what Dr. Crouse has said. I am on record in this matter about dentists, or even rhinologists plunging into the antrum at every provocation. A large percentage of antral troubles get well without any surgical interference, but it does become necessary sometimes to surgically interfere. Whenever you have empyema or a foreign growth in the antrum it is best to operate. The domain of the dentist runs very closely into that of the rhinologist in a large percentage of antrum cases from the accessory sinuses, and you may be operating on the antrum supposing that the case is primarily infected from the antrum, when you have only reached the effect and not the cause. We have not any business to open up a frontal sinus, as dentists; as surgeons we have a right to trefine the frontal sinus. All antral troubles do not come from pulpless teeth, but a large majority of them are caused by infection through the nose and the accessory sinuses, and that is the domain of the rhinologist and not the dentist. A large number of these acute cases get well without any surgical treatment.

DR. T. L. GILMER:

The question has been asked why I would use such an offensive material as iodoform in the antrum or about the mouth, as it is not an antiseptic. I grant that it is not an antiseptic, but all men who have practiced surgery know that there is an influence exerted through iodoform which is antiseptic; i. e., as iodoform comes in contact with raw surfaces iodine is set free and this is an antiseptic. Iodoform would not be used by the very best surgeons in this country and in other countries so generally, if it were not a valuable remedy. In regard to the odor—if the antrum be packed with iodoform gauze, the breath of that patient, except when the gauze is first put in place, is not offensively charged with the iodoform odor. I am asked why I do not use boracic acid gauze in place of the iodoform. Simply because if boracic acid gauze is packed into the antrum, or any wound, in the mouth in six or eight hours it becomes infected. As to the other material, aristol—I have never used it. I know that I get the very best possible results from the use of iodoform. I know that wounds heal better under its influence than any other material I have ever used, beside it prevents and relieves pain.

DR. C. E. BENTLEY:

You say that boracic acid gauze is infected in six or eight hours?

DR. GILMER:

I say that if it be used on wounds in the mouth it will become offensive in that time and this means infected. If iodoform be used on the surface of the body, where the fluids do not come in contact with it, then we would have the iodoform odor, but if placed in the mouth the offensive odor is almost nil. I suppose this arises from the fact of its coming in contact with the secretions of the mouth. Now in regard to Dr. Crouse's statement. I presume that he would like to impress upon us that we should be conservative; that we should not jump into the performance of surgical operations too hurriedly. I agree with him perfectly. I think that any experienced or careful man, whether he be a dentist or a general surgeon, is not likely to do a surgical operation unless there is positive need for it; if there is a need, then he should do it. I would ask Dr. Crouse how he got into the antrum to irrigate it, if he did not do a surgical operation to gain access to the cavity? Suppose we have an irritation of the Schneiderian membrane, and through continuity of tissue we have inflammation of the linings of the antrum with an engorgement. I certainly think it is better to do a slight surgical operation and drain off the fluid, than to allow the patient to suffer for days and perhaps weeks, with a possible result of empyema as a consequence.

There was one other thing that I wished to speak of. Dr. Black, in recording one of these cases, spoke of a case in which an external operation was made for the treatment of necrosis of the lower jaw. I want you to understand very distinctly that I am opposed, and in the great majority of cases there is no necessity whatever for an external opening for the treatment of necrosis of the jaw. The reason that the external opening was made in this case was because there was already a large opening on the face, which the pus had made, before I saw the man. True, as Dr. Crouse has said, necrosis may get well of itself, and caries may get well of itself, but neither always does, indeed it is very rare that extensive caries of the jaw or any other bone will be cured by simple irrigation, therefore it is necessary for dentists to do surgical operations sometimes.

Dr. J. E. Nyman:

Talking about iodoform, I would like to ask Dr. Gilmer if it has ever been demonstrated that free iodine was liberated by the tissue from iodoform. What iodoform does do is to act as a stimulant to the tissue, but it is a toxic stimulant under certain conditions.

Dr. T. L. Gilmer:

I cannot at this moment say who has demonstrated that iodine is set free from iodoform, but it is spoken of in many of the best works. I know that we do very occasionally have systemic poisoning, but I have never seen a case of the kind, neither have I seen a case in which the tissues were injured by it; in my experience they always seem to be benefited by its use.

Dr. Geo. W. Cook:

I think in the main that both parties are right. I have had occasion once or twice to look this subject up pretty thoroughly. Dr. Fenger first set me right in the matter by referring me to a good deal of literature that had been written, and in some of it was brought out the fact that iodine was in no sense an antiseptic, except in the presence of certain micro-organisms. It is antiseptic to the tubercle bacillus. The tissues in the human body or in the higher animals have no effect one way or the other with the exception of a tendency toward absorption of iodine and iodine combinations, as it is known that iodine will be absorbed sometimes by mucous surfaces to a slight extent and bring about a general physiological effect of iodine. It was also found that there were about six micro-organisms that we had to deal with in tissue that did actually liberate iodine, and therefore it became an antiseptic, but in most all tissue we find that there is no effect except in the stimulation of the higher cellular structure and in that way it perhaps promotes a condition of antisepsis, or, in other words, it immunizes the tissue against the action of micro-organisms. I think the point that Dr. Gilmer made in regard to the use of iodoform in the mouth, so far as its odor is concerned, is partially true. It has been found in packing the vagina, and other mucous surfaces with iodoform gauze that the odor rapidly disappears, but if you pack the antrum with iodoform you would naturally get odor for the first twenty-four hours. After that possibly you would get very little. I think that the use of it in the oral cavity is objectionable, because there are many other things, it seems to me, that can be used better. Of course, the statement of a man who has had a long practical experience in the use of these remedies certainly is worth something, regardless of the scientific investigations of those who believe that iodoform has no antiseptic properties, but I believe from experiments I have made that iodoform is not antiseptic, except in those special cases where we have a micro-organism.

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THE COMING ODONTOGRAPHIC MEETING.

If there is a man practicing dentistry in the United States or Canada who has not already been made aware of the fact that the Odontographic Society of Chicago, in the celebration of its fifteenth anniversary, is about to hold one of the most important meetings ever attempted by a local dental society, then that man surely does not read the journals or mingle much with his fellow dentists. Even the most sanguine and enthusiastic of its advocates had not the slightest conception at the outset of the magnitude to which the event was destined to develop, and each day seems to add to the interest manifest in this meeting. It will be well worth while traveling across the continent just to meet the men who will be here on that occasion.

Every State in the Union promises to send a delegation, and there will be a large representation from Canada. Many local societies at distant points have passed resolutions to come in a body, and if there does not assemble in Chicago on February 16 and 17, 1903, the largest and most representative body of dentists ever brought together in this country—with the possible exception of the congress of 1893—then all signs must fail.

There will be clinics on every conceivable kind of operation known in dentistry, by the very best operators. The excellence of the literary part of the entertainment is already assured by the acceptance of essayists of known ability, and as for the social features—well, Chicago will attend to that. The only thing necessary now is for the profession to turn out in anything like the numbers that have already indicated their intention to come, and a most memorable event will be the result. Cross off your appointments for that date at once, and let nothing interfere with your attendance.

THE EDITOR'S DESK.

Motive.

I can forgive a man almost anything if his motive is good. He may provoke me to desperation by his blunders, and make me almost despise him for his density, and yet I can forgive him if he means well. The designing man with a smug exterior but with a false heart is my especial detestation. Even the good he does carries with it an unsatisfactory savor. As I study the motives of men I am frequently reminded of that phrase in "Ecce Homo"—a book with a world of philosophy in it—"It is true that a good man does good deeds, but it is not necessarily true that he who does good deeds is a good man. Selfish prudence often dictates a virtuous course as unerringly as virtue itself."

And when I see a man do another a good turn with all the while a hidden depravity in his heart and with an ulterior motive behind it, I am nauseated to the depths of my being, and shaken throughout my entire moral fiber. I care not how polished or accomplished a man may be if he is not honest I want none of him. And the incomprehensible thing to me about most men with bad motives is that they so frequently delude themselves with the belief that they are deceiving the world as to their honesty. I do not believe it was ever the case that a man lived long in a community in close association with his fellows without at least some of them understanding his motives. We hear occasionally a blare of trumpets over the fact that a certain man has deceived a whole community by leading a double life, posing at one time as a moral, religious man and at other times sinking to the depths of degradation, but the very excitement over such an occurrence proves the rarity of it. And it is safe to conclude that even with the most skillful tactician—with these men whom the world heralds as having successfully played a double role—it is always the case that some few in the community understood perfectly their motives and are not surprised when the exposure comes. It is assuredly true that with most men motive is easily read, and sooner or later a man's motives form the basis of the estimate which the thinking people of the world place upon him. Be honor bright and study well your motives.

The Institute of Stomatology and the Odontological Society both held their annual meetings and elections in December.

The Institute was reported in a very healthful condition, both financially and in numbers. All the officers for 1902 were reelected.

The Odontological Society also reëlected its officers. Its financial strength is probably greater than any other society in the vicinity.

The Central Dental Association of Northern New Jersey announced no regular essayist for their December meeting, but on request, Dr. LeRoy, of New York, opened the way for an informal discussion on the use of fiber golds, particularly the moss fiber.

At the November meeting of the Second District Society, held at the Brooklyn Medical Library, on Bedford Ave., Dr. Levitt E. Custer, of Dayton, Ohio, read a paper on the X ray, which was very interesting. He had with him an apparatus for demonstrating the phenomena. He uses a Ruhmkorff coil of ten or twelve inch spark which he maintains, is very much better than the static machine. Some photographs of mouths and teeth of some of those present were taken, which will be returned to the society when completed. A beautiful skiagraph of a hand was shown that evening which was so perfect that the cancellous bone at the ends of the digits was as plain as if photographed from the skeleton.

In the discussion which followed Dr. VanWoert, who has done much photographing with the static machine, agreed with Dr. Custer that the coil machine was probably very much better.

At the December meeting held at the residence of Dr. Kenneth McDougall, 119 Halsey St., Brooklyn, short papers were to be the order, but beyond incidents of office practice little else of interest transpired, except the reading of a short paper on "Bromo-chloron," the new disinfectant, by Dr. Barker, of Brooklyn.

In the near future we will have "lots doing" in our dental meetings. The annuals of the Odontological, First and Second District Societies and the C. D. A., of New Jersey, occur soon, and in January a dinner is to be given to Dr. C. S. Stockton, of Newark, N. J., at the New York Athletic Club. This probably will be a memorable function. On January 1, Dr. Stockton will have completed forty-five years of continuous dental practice in New Jersey.

His admiring friends have undertaken this dinner as a slight token of appreciation. Dr. W. W. Walker will be toastmaster. There will be many speakers. All those of your readers who can come to New York at that time (January 21) will be more than repaid for the trip. The whole day preceding, January 20, is to be a banner one for the Odontological Society which ushers in the New Year with the greatest event of the season. The morning and afternoon are to be devoted to clinics and these are to be of very choice character. In the evening a paper worth coming to hear will be read, after which a collation will be served.

Gentlemen from many parts of the United States have signified their intention of being present at both events.

Yours, etc., "The Boroughs."

PRACTICAL HINTS DEPARTMENT.

Edited by G. W. Johnson, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, The Dental Review, 55 State St., Chicago, Ill.]

Inlay Work. — If Dr. Burke (p. 1078, December Review) will substitute Ash's dental lac for gutta-percha, he will have a quicker, more rigid and perfect impression. Warm a piece of the dental lac, a little larger than cavity, press to place, cool with a jet of water and remove. Try it.

Percy St. C. Smith, Port Rowan, Ont.

◆

To Clean Rubber Dam Clamps.—To clean rubber dam clamps, place a number of them in the palm of the hand, add a little powdered pumice, moisten with water and work together for a few minutes; then rinse in clear water and you will find that all the little crevices so hard to get at will be polished.

F. W. Stephan, Chicago.

Thymol.—Thymol for the treatment of chronic alveolar abscess has done for me what no other single remedy has been capable of doing. To get the best results use a saturated solution of thymol crystals in alcohol always having some of the crystals undissolved in the bottom of the bottle. Cleanse the root canal paying little or no attention to the fistulous tract. Insert a dressing of cotton saturated with the thymol solution and seal the cavity *tight* with gutta-percha. Leave four or five days and repeat if necessary. W. H. HERSH, Chicago.

◆

Porous Rubber Dentures.—Porous plates are usually attributed to improper vulcanization. There is another cause, however, which should not be overlooked. The mold in which the rubber is packed must he made strong enough to resist the pressure caused by the expansion of the gas which is formed during the process of vulcanization. If the plaster in the flask is not dense and hard it will be forced back, and there being no pressure to drive out the gas as it is formed, the result is a porous plate. The plaster for flasking should be mixed with as much care as for making models.

◆

Pressure Anesthesia.—In my hands pressure anesthesia for the painless extirpation of pulps has proven a failure in cases where there are extensive deposits of secondary dentine. I find it is usually a waste of time where the aforesaid condition obtains. A minute amount of devitalizing paste perfectly sealed in the cavity will give more satisfactory results. Where an exposure of the pulp exists or can be made without producing more pain than would be necessary to properly excavate the cavity for filling, I believe immediate extirpation after pressure anesthesia should be practiced universally.

F. P. CRONKITE, St. Joseph, Mo.

◆

To Dispense With the Rubber Dam.—Many treatments and fillings may be made without applying the rubber dam by using cotton rolls or preferably bibulous paper rolls and napkins held in place by an ordinary rubber dam clamp. One can sometimes leave the patient with quite as much security as where the rubber is applied. In places where the saliva flows freely the saliva ejector is of much value. In working on the upper teeth it is sometimes of great value to lay a sheet of rubber dam in the fold of the napkin to keep the moisture from penetrating. There have been many devices made for the above purpose, but the ordinary clamp serves quite as well as any.

F. W. Stephan, Chicago.

Method of Taking a Bite.—Form base plates and wax rim as usual and place a bead of soft wax, about the size of a bean, on the occlusal surface of the wax rim on both sides, and about the position of the second molars. Having these beads of wax very soft, place the plates in position in the mouth and request the patient to close the jaws. If there is a tendency to displacement of the plates they can be held with the fingers. The beads of wax will first come in contact with the upper plate, and the resistance will cause the muscles to bring the lower jaw into its proper relation to the upper before the wax rim touches elsewhere. This may be termed a "psycho-physiological" method of obtaining a correct bite as it produces the natural mental and physical stimulus. The patient should never be requested to *bite*, as the word is frequently interpreted to mean the most forward position of the jaw.

Edward J. Rohrer, Sigourney, Iowa.

Preparation of Roots.—In the preparation of roots for the application of dowel crowns with a band the procedure incident to the easy and accurate adaptation of the band may be greatly facilitated by allowing a projecting end of the root of about $\frac{1}{16}$ of an inch to remain until the peripheral trimming, the taking of the measurement, and the fitting of the band have been accomplished.

Such a precaution not only facilitates the removal of enamel, and the taking of an accurate measurement, but the projecting end of the root serves to properly shape the band before it comes in contact with the soft tissues, and to guide it to place in fitting, thus assuring accuracy in the adaptation, and relief to the patient from the discomfiture usually attending this portion of the procedure. When the band has been thus fitted both it and the root may then be cut down to the proper point, and the cap completed in the ordinary manner. Hart J. Goslee.

Temporary Crowns.—As a means of relieving the patient of disfigurement and embarrassment during the construction of a permanent crown, and for the purpose of facilitating the subsequent adjustment of the same by keeping the gums packed away nicely and exposing the end of the root, temporary crowns should invariably be employed in crowning anterior teeth. This expediency can be observed and such crowns constructed in a few minutes by selecting and adopting an ordinary facing, and attaching a dowel made of German silver wire of proper size. The attachment may be made by flattening and notching one end of the dowel in such manner as to engage the pins, and then bending them over upon it, or soft solder may be used if desired, and the crown then mounted with gutta-percha or temporary stopping. Whenever the time required to complete the construction of the permanent crown precludes finishing and mounting it on the same day that the root is prepared, the possible advantages resulting warrant the expenditure of time for this purpose.

HART J. GOSLEE.

Method of Repairing a Turner Furnace. — On removing a piece of work from my Turner furnace, I found it badly "gased." Looking in, I saw a point of flame shooting up from a pin hole in bottom of muffle. Here was an emergency—work important to be finished, and no other furnace available. To meet it, I took a little ball of Melott's moldine (fire clay and glycerine) and pressed it through the hole with my finger until it appeared on under side. Then, with another finger in hole at back, pressing up from below and down from above, a button was formed on either side. The furnace was fired up slowly until the glycerine was burned out. This was some weeks ago, and I have used the furnace many times since without trouble. I attribute the burning out of muffle to having dropped a piece or two of gold on the bottom, and it, uniting with metal of muffle, caused a weak spot. To avoid this in future, I use a piece of platinum plate to carry gold into furnace, same side up each time. The gold as it melts unites with platinum, and when enough has fused it can be rolled thin and used for backing.

H. T. KING, Fremont, Neb.

MEMORANDA.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The semi-annual meeting of the Wisconsin State Board of Dental Examiners will be held at the Hotel Pfister, Milwaukee, Wis., January 26, 1903.

All candidates wishing to take the examination to practice dentistry in this State will present themselves at 9 A. M. J. J. WRIGHT,

Secretary.

OHIO STATE DENTAL SOCIETY.

At the thirty-seventh annual meeting of the Ohio State Dental Society the following officers were elected for 1903: President, J. B. Beauman, Columbus; first vice-president, J. F. Stephan, Cleveland; second vice-president, W. T. McLean, Cincinnati; secretary, S. D. Ruggles, Portsmouth; treasurer, C. I. Keely, Hamilton. S. D. RUGGLES, *Secretary.*

DENTAL DEFENSE ASSOCIATION OF NEW SOUTH WALES.

On November 11, 1902, the above association was formed, having for its objects:

"A. To render assistance to any member who may be threatened with or involved in any action at law or prosecution arising out of the practice of his profession within this State.

"B. To assist in any movement which will promote fraternity among the members, or elevate and improve the social and legal status of dentists.

"C. Promotion of the welfare of the dental profession of New South Wales."

It seems that the dentists of Australia have frequently been imposed upon by irresponsible parties bringing groundless suits against them for damages, and this is a most laudable move for mutual protection on the part of the profession.

DENTAL MANUFACTURERS' EXHIBIT HORTICULTURAL HALL, PHILADELPHIA, MARCH 17, 18, 19, 1903. AN IMPORTANT ANNOUNCEMENT.

This exhibit has been arranged to afford the most prominent manufacturers of dental goods in America the opportunity of exhibiting their products to the dentists of Philadelphia and vicinity. It is going to be the most attractive display of the kind ever attempted. It is a business enterprise on the part of the manufacturers quite in keeping with the magnitude of the interests involved.

Manufacturers' clinics have been arranged, of which subsequent announcement will be made, which will alone justify the attendance of every man interested in the advancement of his profession.

It is proposed to make a visit to this exhibit in itself a liberal education in the better class of goods made for dental purposes.

Open from 9 A. M. until 10 P. M.

Admission free.

"Come as often as you please, stay as long as you like."

THE

DENTAL REVIEW.

VOL. XVII. CHICAGO, FEBRUARY 15, 1903. NO. 2

ORIGINAL COMMUNICATIONS.

SOME NOTES UPON THE DENTITION OF THE ELEPHANT AND INJURIES THERETO.*

BY W. MITCHELL, D. D. S., LONDON, ENGLAND.

Mr. President, Ladies and Gentlemen.

It may not be out of place to give a brief synopsis of the habitat, past and present, species, and differentiations of the noble animal, the study of whose dentition is the basis of this paper.

Sixteen different species of fossil elephants have been described by naturalists. The best known of these is the Hairy Mammoth, *Elephas primigenius.*

While fossil remains of elephants have been found nearly all over Europe, Asia and America, some islands in the Mediterranean have contributed very interesting specimens of teeth of what was a pigmy representative of this diversely disseminated quadruped.

In passing it may not be amiss to call your attention to a few interesting points in connection with the dentition of the prehistoric predecessors of this order of mammalia. In the Dinotherium, and the Hairy Mammoth, the molars are replaced vertically, whereas, in all the other *proboscidea* the replacement takes place horizontally.

In examining many specimens of prehistoric elephants, I have been impressed with the modification of the arrangement of the enamel plates, and while in some their abruptness, rugged irregularity of outline, and wonderful dynamic capacity was strikingly manifest, the comparative proportion of cement, dentine and enamel seemed to be practically identical with those of a finer or more delicate organization.

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*Read before the American Dental Society of Europe, August, 1902.

For our purpose we will consider the present representatives of the *genus* Elephas, viz., Elephas Indicus, and Elephas—or Loxodon—Africanus. As the names imply, one is a native of India, the other of Africa. The teeth of these animals are by no means their only distinguishing characteristic; the differentiation in the shape of the skull, ears and termination of the trunk furnish as unmistakable evidence as to which species the animal belongs, as do the teeth themselves.

It is interesting to note here that the type of elephant so generally distributed in early days over the countries named, was no doubt the ancestor of the present Asiatic species; as we find but slight evidence, even of a reasonable approach—from a dental standpoint—to the present African representative, especially is this the case when we consider and compare the skulls.

There is probably no known animal which has such an interesting and complex dentition as the elephant. The process of development and eruption of the temporary and permanent teeth, the peculiar shape and size of the incisors, the structure of these teeth or tusks, the interesting differentiation and arrangement of the molars, furnishes a field for study which will fully repay the investigations of the student of comparative dental anatomy.

A unique fossil specimen, *elephas orientalis,* found in a cave in China, possesses a distinct characteristic, in that the enamel plates are dentated in a nodular way, along their masticating surfaces, showing that the animal subsisted upon a hard fibrous diet, which not only required thorough mastication, but considerable primary crushing and splitting, such as we would naturally consider bamboo and other reedlike specimens of vegetation would require.

The dentition of the pigmy elephant—*Elephas Melitensis*—is the smallest species of this order of mammalia, some of the lower molars only measuring one inch by two inches in their transverse, and antero-posterior diameters, yet showing all the same perfect minutiæ of development and arrangement of their component parts, as the larger varieties.

An interesting point in connection with the study of prehistoric remains, is the fact that I have been unable to find any trace or record of any having been discovered in Africa, or in the Antarctic circle, while the north polar regions have contributed many rare and valuable specimens. This may be because the south polar regions

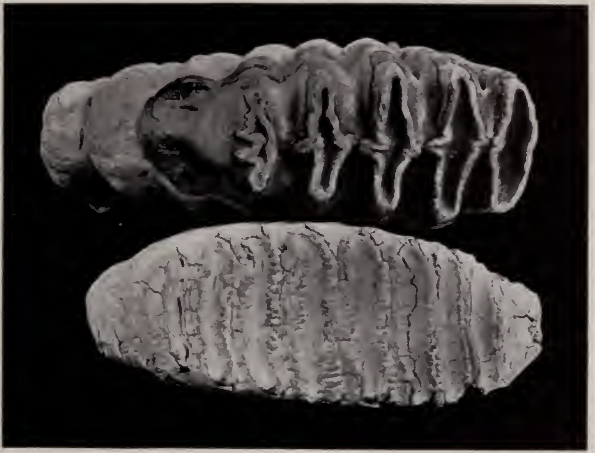

Fig. 1.

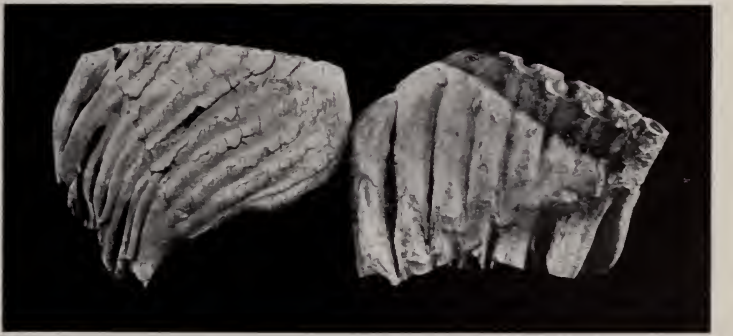

Fig. 2.

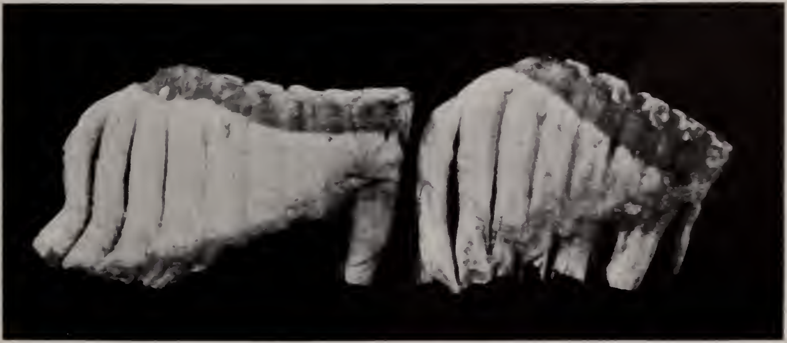

Fig. 3.

have not received the attention of explorers, as have the higher latitudes.

The farthest south where the remains of elephants have been found is in Peru. We may, therefore, from our present knowledge consider that the prehistoric elephant was unknown in Africa, the islands of the Pacific ocean and Australasia.

The elephant is the only known animal whose teeth are developed and displaced horizontally, and that, too, with the portion extruded from the alveolus and gum perfectly developed, while the succeeding plates are in a transition or partly developed state.

The formula of the dental armament of the elephant appears to be:

$$\text{incisors } \frac{2-2}{0-0} \qquad \text{molars } \frac{6-6}{6-6} \qquad \text{total 28.}$$

The deciduous tusks make their appearance about the sixth month and are about two inches in length, and about one-third of an inch in diameter. The roots of these teeth differ materially from their successors, in that at their arrival at perfect development they are perfectly solidified, and tapered somewhat toward the distal end, which is slightly bent; much absorption has usually taken place upon the surface contiguous to the permanent tusks, before they are proliferated, which usually occurs a month or two before the permanent ones show through the gums, the latter event occurring between the first and second year.

Mr. Corse, an authority quoted by Prof. Owen, says,[1] "At this period the permanent tusks are black and ragged at the ends. When they become longer and project beyond the lip, they are soon worn smooth by the motion and friction of the trunk." Prof. Miller tells us that beneath the outer layer of cement on the points of the tusks of young elephants he has found a layer of enamel,[2] which is soon worn away after eruption. I believe Prof. Miller is the first investigator who has noted this. I believe I also noticed the same condition upon the points of the temporary tusks of a rachitic specimen which came into my possession some time ago, but cannot say positively as to the true character of the tissues, as I did not subject them to a microscopic examination.

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[1] Owen's Odontography.

[2] *Dental Cosmos*, May 1890.

Owen says,[3] "the widely open base of the tusk is *fixed*"—italics mine—"upon a conical pulp." Cuvier says,[4] "I have myself opened the alveole of the base of the tusk of an elephant recently dead and distinctly saw there a pulpy nucleus of enormous size, and entirely without any sort of organic union with the tusk, which it had nevertheless secreted. Although this particular specimen was perfectly fresh there was not to be seen the least adherence between the tusk and the nucleus; not the slightest fiber, nor the most minute blood vessel; nor was there a trace of any cellular connection between them. The nucleus was in the hollow of the tusk like a sword in its scabbard, and only adhered itself to the bottom of its alveole." These are the diverse opinions of the two greatest investigators upon this subject. Owen's statement seems the most feasible, as it implies a vital connection between the pulp and the tusk, while Cuvier's suggests that the pulp proliferates the differentiated tissues of the tusk upon that portion of the tusk immediately in contact with it, while blood pressure, and a functional extrusive force in connection with the pulp accounts for the elongation of the tusk from its alveolus, in the meantime it is dependent upon the peridental membrane and the apposition of the alveolus for its vital retention. I believe it will be found some day that there is a greater coördination between the pulp and the investing membrane of the tusk than either of the authorities quoted have given credit for, and that this very important point in connection with this subject will be satisfactorily cleared up. It is difficult to understand how such a ponderous organ as the tusk could be developed and maintained by periosteal and pulp apposition alone, and the fact of the wonderful repairs which take place after injuries, and the locale of these repairs militates very much against Cuvier's statement. The teeth and tusks of the elephant are proportionately larger than those of any other known animal. While the tusks of the elephant must be considered as incisor teeth, and consequently part of the dentition of that animal, their function without doubt is as organs of defense and offense, and not in any way properly speaking, connected with nutrition, as are the powerful and well developed canines of the carnivoræ, the more largely developed canines of the Chinese water deer, or those of the hippopotamus. In captivity the elephant has learned to use

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[3] Owen's Odontography.

[4] Cuvier's Recherches sur les ossemans fossiles. Paris 4°, 1821, 24. 5 tom. Extract from Vol. 1, pp. 47.

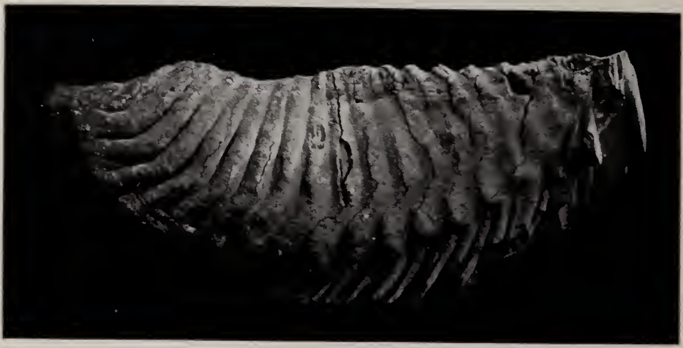

Fig. 4.

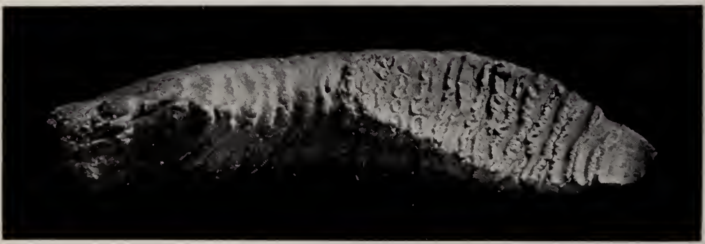

Fig. 5.

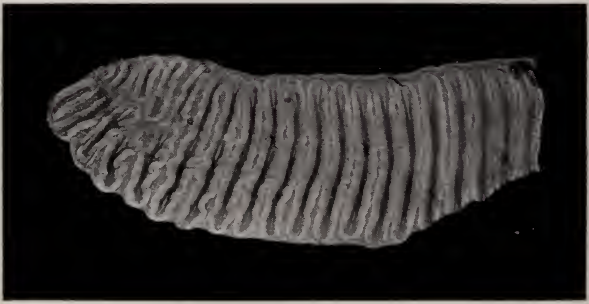

Fig. 6.

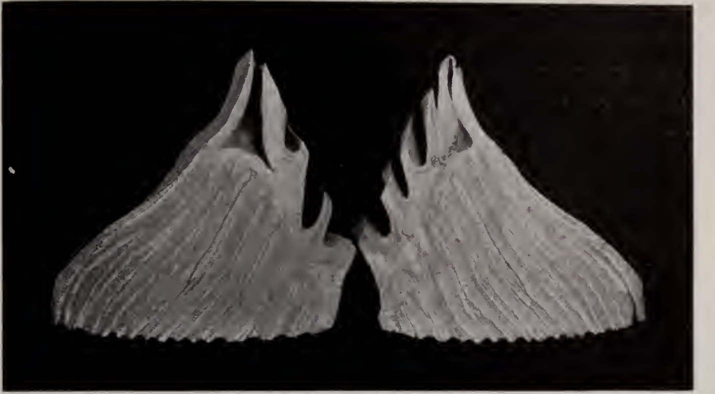

Fig. 7.

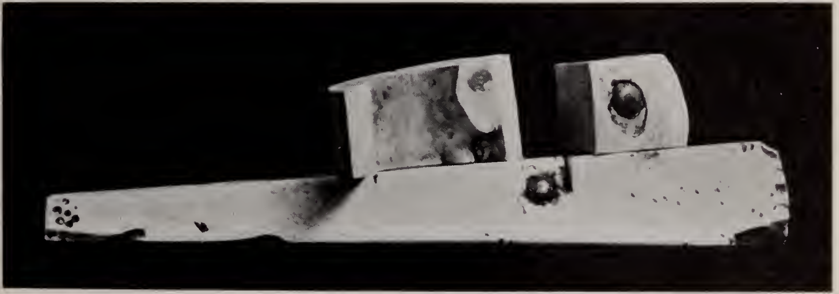

Fig. 8.

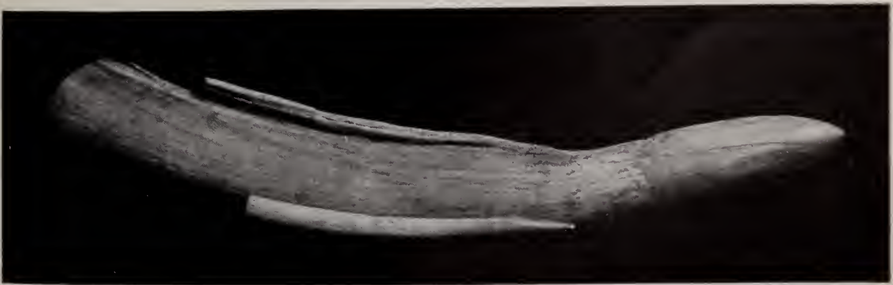

Fig. 9.

its tusks in conjunction with its trunk in rolling or moving heavy timbers in the saw mills and forests of India and the Malay peninsula. From the standpoint of dental development there are three species of the Indian elephant, the small tusked variety being called "Mahkna," the large tuskers being called "Dauntela"; there is also a tuskless variety; whether this is an aberration of either of the foregoing there seems to be no definite knowledge.

From causes of an accidental nature, the development and direction of the tusks may be greatly modified either as to shape, size, or direction. In the case of an elephant which lived for some years in the Jardin des Plantes, Paris, Cuvier says, in continuing his previously noted quotation: "The tusk rests in its alveole like a nail driven into a plank. Nothing keeps it there but the elasticity of the parts that press upon and closely surround it; thus the direction can be altered by gentle pressure. This is an experiment that succeeded with our second elephant; its tusks were growing toward one another in such a way as to impede the movements of its trunk; they were gradually separated by means of an iron bar, the middle of which was in the form of a screw, and which could be lengthened at will."

The molars of the elephant are developed and erupted proportionately to the development of the jaws, and the requirements of the animal. This process is carried out in a lamellar or plate like manner, the summit of each plate is developed first, the dentin occupying the space inside the enamel plates, which surrounds it. These plates are then all firmly united by a less dense substance called cement. This consecutive process is carried on until the typical tooth is formed, being complete upon the formation of the root, which is the last portion to be developed.

It is an interesting fact to note that the molars of the elephant are developed inside of a bony capsule up to the time of their extrusion through the gum. This capsule very much resembles in comparative thickness and appearance the turbinate bones of the nares, and entirely envelopes the tooth, and is progressively developed in size with the growth of the tooth, eventually being absorbed away as the grinding surface of the tooth is extruded from the gum. The mesial occlusal plates always being the first to appear. Upon the perfect development of the tooth this capsule is entirely obliterated. The temporary molars as well as the first two permanent ones are, generally speaking, of a triangular shape, sec-

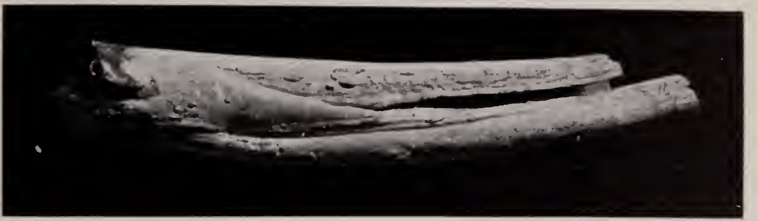

Fig 9a.

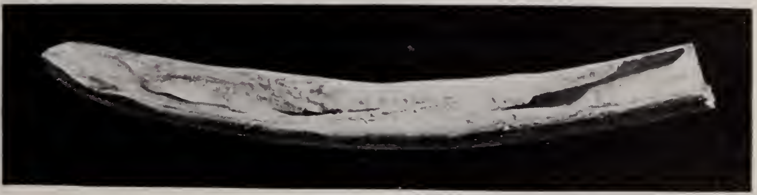

Fig. 9b.

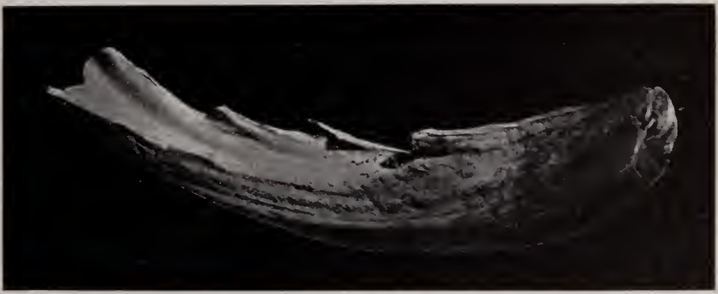

Fig. 9c.

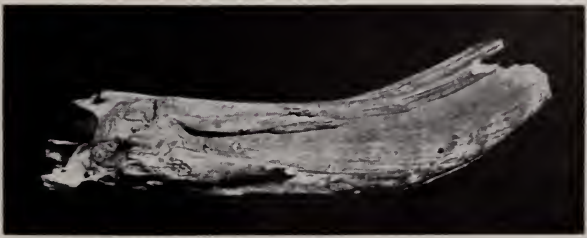

Fig. 9d.

tionally considered through their antero-posterior-vertical aspect; this is to allow the wearing away of the anterior portion, prior to their obliteration, or shedding, to make room for their successors. This finally results in but one molar occupying the space previously occupied by two. The great difference in size between the first and second molars is attributed to the fact of there being no premolars in the dentition of the elephant. The number of plates vary in these teeth, from four in the first molar to twenty-three or more in the sixth molar, the latter tooth being extruded at about the fiftieth year. In many cases the jaw does not appear to be large enough to permit the full development of this tooth. This results in a compression and an overlapping of what would represent the terminal plates. These are consequently never perfectly formed, but are split up and huddled together in groups, thereby losing their typical identity, and thus present a heterogenous and nodular mass quite different from the anterior portion of the tooth. See Figs. 1 and 5.

The general difference in appearance between the Indian and African elephant has already been noted. To this I would add that the female African elephant usually has tusks, and sometimes very large ones, while the males are noted for the immense size of their tusks. In this respect they outrank those of the Asiatic species, as well as in the quality and color of the ivory. It would have occupied too much of the time of this meeting to have gone quite minutely into the many very interesting phases of this subject, so I will endeavor to entertain you with some striking and eloquent object lessons upon the screen.

Fig. 1 shows the difference between the grinding surfaces of an upper molar of an Indian and African elephant, the lower is the Indian, the upper the African. It would seem from the appearance of these teeth that the African species was endowed by nature with the means of subsisting upon a rougher or coarser diet than was the Indian elephant.

Fig. 2 is a side view of the same teeth. Note the difference in shape and size of the plates. These teeth are practically the same age.

Fig. 3 shows an upper and lower molar of an African elephant —opposing teeth. Note concave plane of masticating surface of lower molar and shape of root. The antero-posterior plane of grinding surface of the upper molar is convex, while the reverse

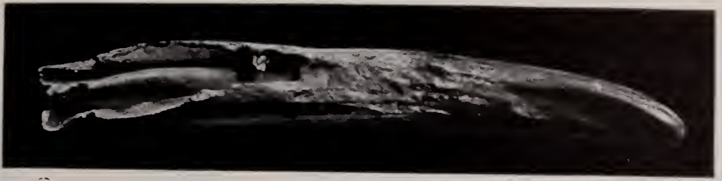

Fig. 10.

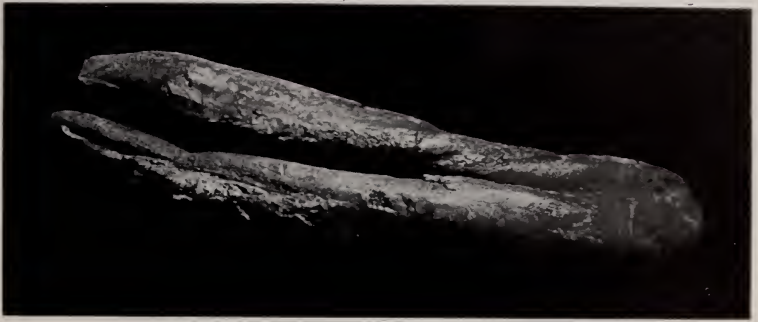

Fig. 10a.

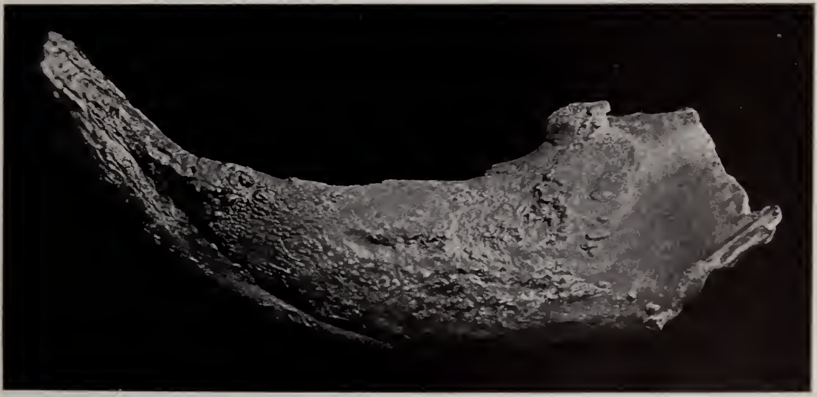

Fig. 10b.

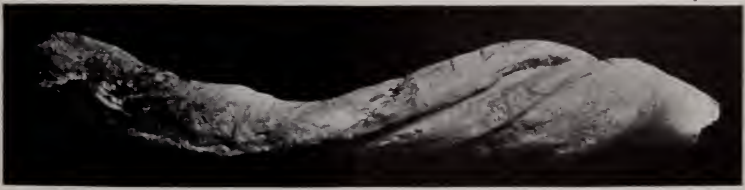

Fig. 10c.

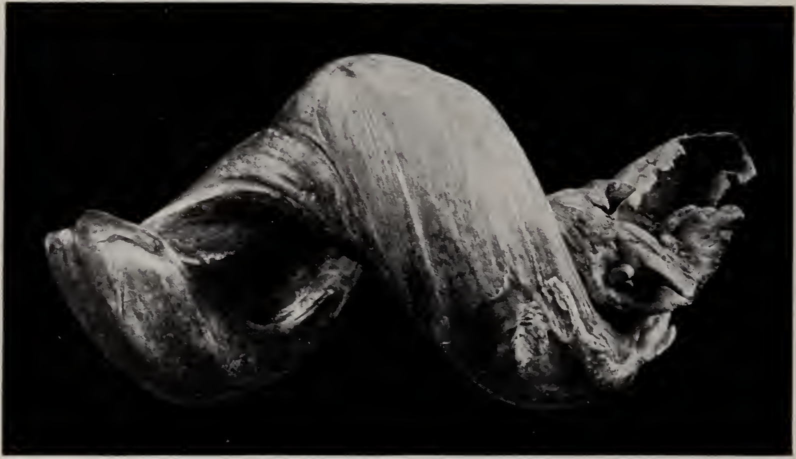

Fig. 10d.

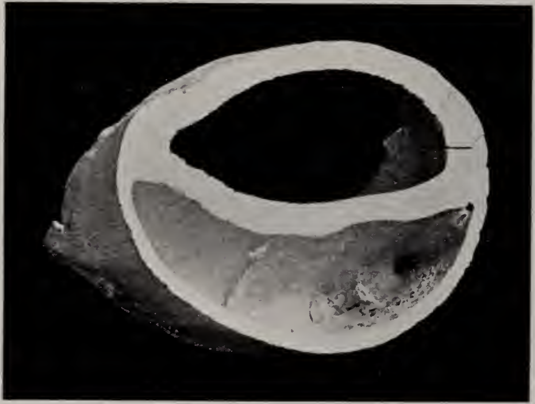

Fig. 11.

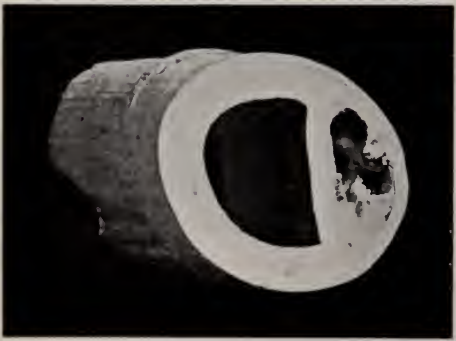

Fig. 11a.

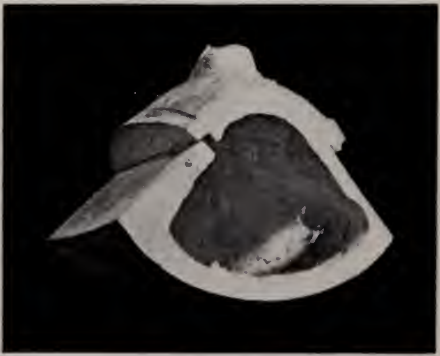

Fig. 11b.

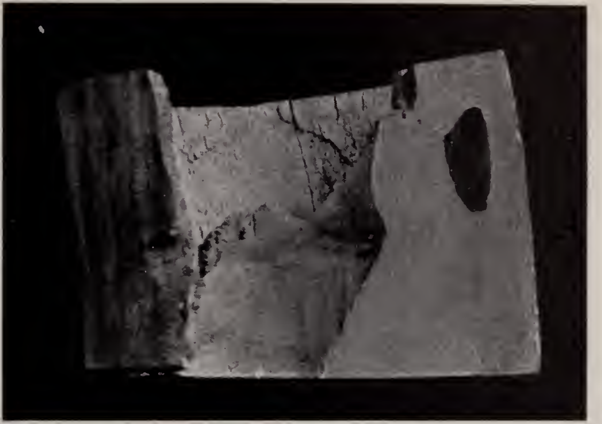

Fig. 12.

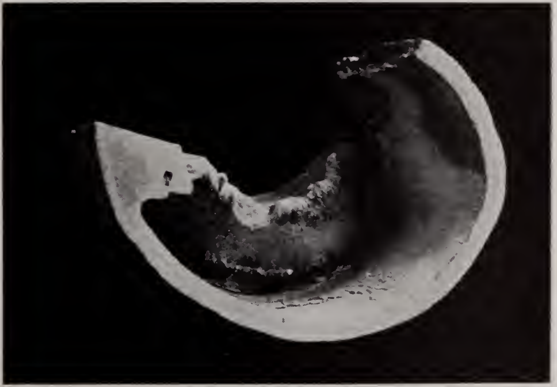

Fig. 12a.

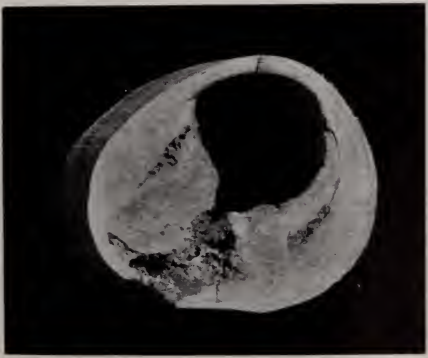

Fig. 13.

Fig. 13a.

is true of the lower. This makes the most efficient grinding surface possible. The shape of the roots in this species would no doubt permit of greater crushing force being applied than would be the case with the tooth of the Indian elephant.

Fig. 4 is a sixth lower molar of an Indian elephant. Note difference in shape and size as compared with the preceding specimen.

Fig. 5 shows the concave grinding surface already spoken of.

Fig. 6 is a horizontal section of a lower molar—Indian—showing the arrangement of the various tissues; the dark compressed vertical lines represent dentine, the surrounding lighter lines the enamel, while the intermediate shade between the enamel plates and around the periphery of the specimen is the cement.

Fig. 7 is a vertical longitudinal section of the upper third molar of an Indian elephant. You will note the short anterior and large posterior root.

Having given you a brief general introduction to the normal condition of the dentition of the elephant, I will endeavor to show you the results of injuries thereto, especially in connection with the tusks.

Ivory being a valuable article of commerce it naturally follows that man is one of the greatest enemies with which the elephant has to contend; this fact, coupled with the aggressive nature of the males, especially during the mating season, causes injuries in some cases of a very terrible nature.

The use of explosive and other modern bullets by the hunters, spears by the natives, and the combats between the animals themselves have resulted in injuries, had they happened to other animals, would have in many cases proved fatal.

The famous elephant, Jumbo, for many years at the gardens of the Royal Zoological Society, London, in a fit of anger, drove his tusks through the iron door of his house, breaking them off close to the alveolus; when they grew again, instead of coming out below the lips, they curved upward and tried to penetrate the cheeks, causing severe abscesses, which necessitated lancing. This was successfully done by Mr. Bartlett, the superintendent. The first operation was in the nature of a surprise to Jumbo, but when he found the relief it afforded him, he submitted more gracefully to the second operation than probably would a human patient, and in his way showed his appreciation to his keepers for their kind-

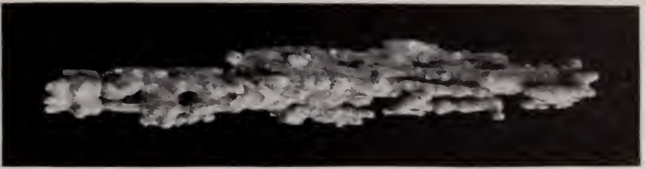

Fig. 14.

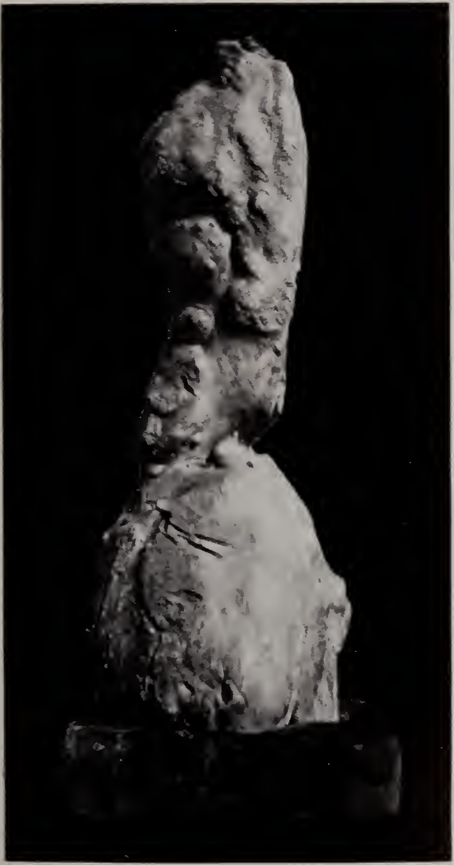

Fig. 15.

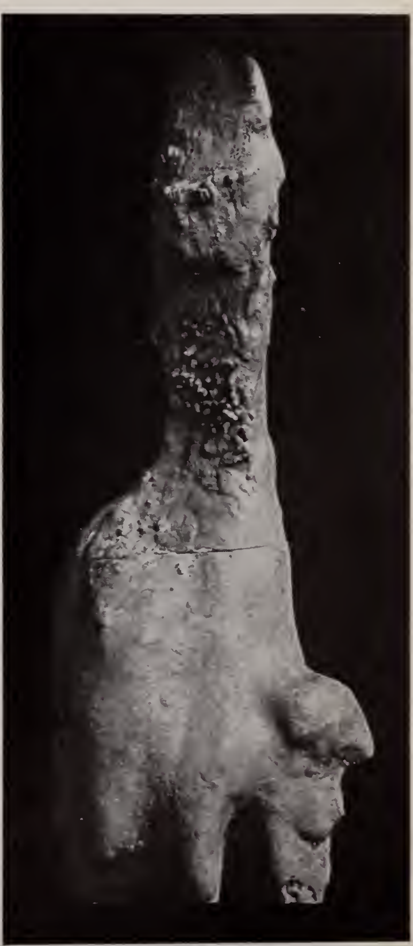

Fig. 16.

ness.[5] In Ward's museum, Rochester, New York, is a cast of Jumbo's lower jaw. This shows the lower molars much out of position, whether the result of the injury to the upper jaw I am unable to say.

Injuries are usually in connection with the tusks. Only in a few instances have I seen injuries to the molars, in one of which I have seen an impacted bullet, illustrating very well how these missiles may be tolerated for an indefinite time without any permanent detriment to the teeth.

The means resorted to by the natives for securing ivory is to locate the watering and bathing places of the animals; then to secrete themselves in trees over the paths leading thereto; then with spears of more or less crude manufacture endeavor to kill the animal as it passes beneath them. In doing this, they aim at the eye, the orbit being the most accessible point to the brain.

Not infrequently, however, owing to the inaccuracy of the aim or the imperfection of their weapons, they fail to dispose of the animal.

In many cases the superior maxilla is penetrated, the spear puncturing the dental pulp from above and passing down into the open end of the tusk, may be broken off or lodged there in such a manner as to cause extensive inflammation and suppuration of the surrounding tissues. This perverts function, and the result may be a more or less modification of that portion of the tusk developed after the injury.

The late Mr. Storer Bennett quoted Prof. Miller as having said that "iron missiles were never encysted in ivory." I have been unable to find where Prof. Miller says this; if he has said so he must have had in mind spear heads and like weapons, for there is no doubt that iron bullets *are* encysted, while spear heads or points *are not*. Where a bullet or spear penetrates ivory in any portion of the tusk not occupied by the pulp, it is encysted. This applies either to bullets or spears. Sometimes the track of a bullet is perfectly obliterated by the apparent resilience of the ivory, which returns to practically its original condition, leaving no trace of injury.

This is illustrated in the large specimen in Fig. 8. The specimen on the left is a lead bullet, the others are iron, and as you can see *are* encysted. But where the pulp is seriously involved

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[5] Bartlett's "Animals in Captivity."

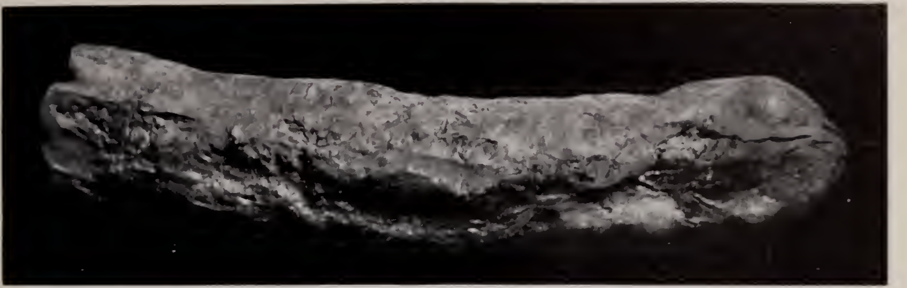

Fig. 17.

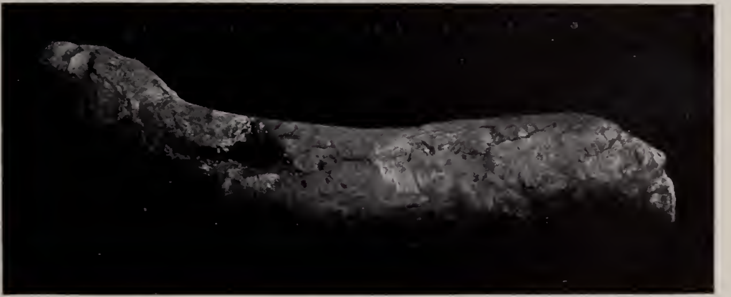

Fig. 18.

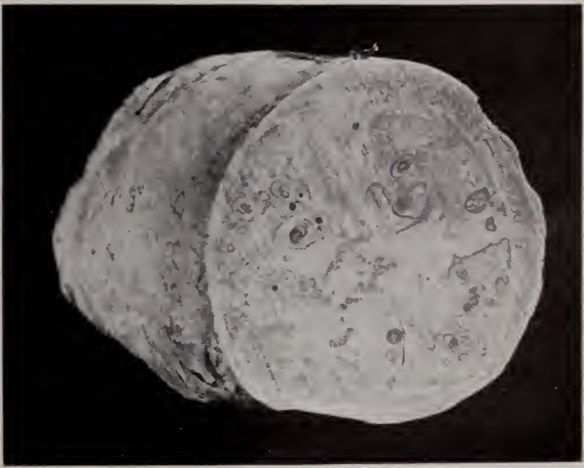

Fig. 18a.

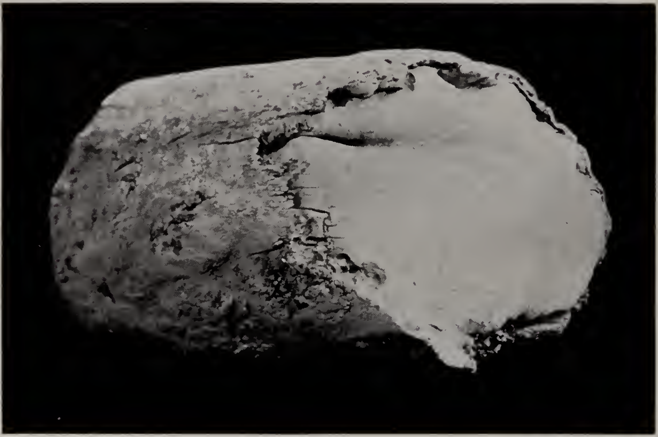

Fig. 18b.

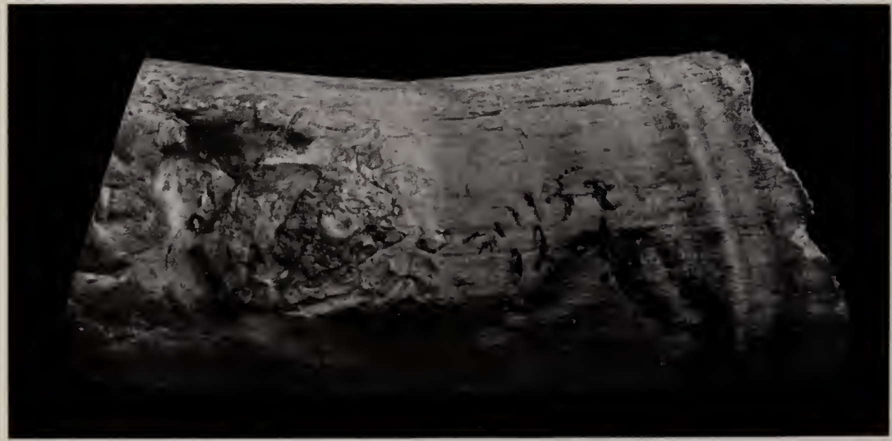

Fig. 19.

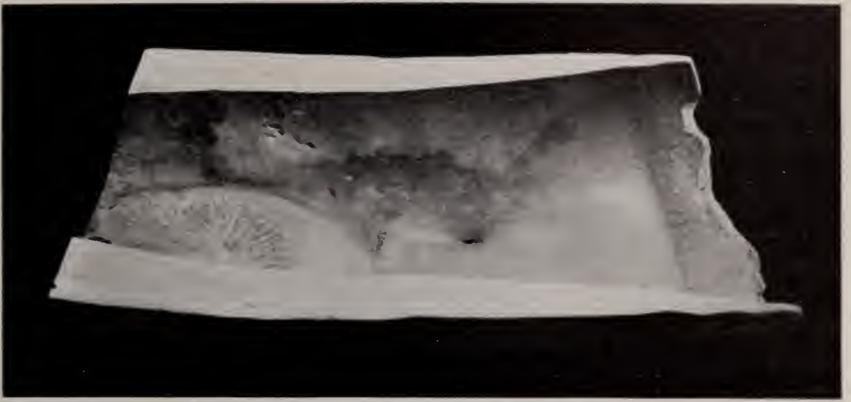

Fig. 19a.

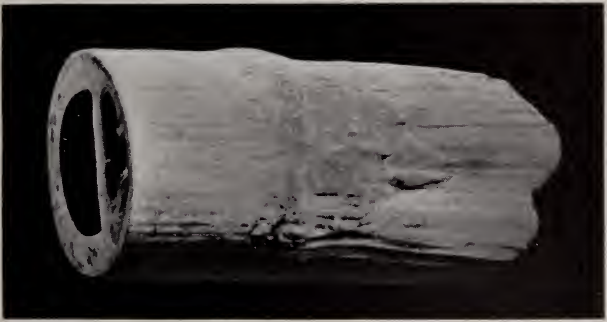

Fig. 20.

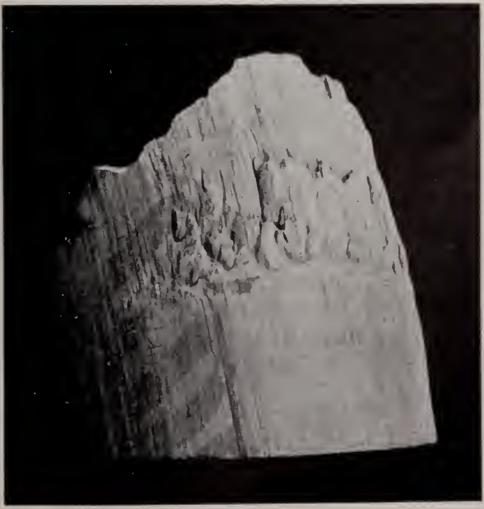

Fig. 20a.

this encystment may not take place; especially is this the case with spear points. These missiles may cause very complicated injuries through being fractured, after being driven home, either by the animal from pain or anger, or by the native in his attempt to regain his weapon.

Copper bullets, as used in Siam and the Malay peninsula, produce an amount of disintegration of tissue in their vicinity out of all proportion to their size, or of the injury caused by them, and are usually found quite loose in the extremity of the cavity they produce.

The reparative possibilities of the dental pulp of the elephant can only be a source of astonishment and interest to those engaged in pathological research; its powers for recuperation are not approached by any other tissue with which I am acquainted.

It will be interesting to note how in some cases it has survived complete disintegration, even where only a very small amount has remained, and how this small portion has been able to resist the encroachment of surrounding pathological conditions is a still greater source of wonder. In some cases we find the pulp has been badly split up by external violence, and after it has recovered from the first shock resulting therefrom it has reëstablished its function, but owing to the rearrangement and infolding of its various tissues it has eventuated in a branched or split condition of the tusk, i. e., the development of the tusk has been carried on from different centers and has resulted in what may be termed—for illustrative purposes—a bundle of tusks.

See Figs. 9, 9a, 9b, 9c, 9d.

In other cases one side of the pulp may have broken down from an injury and sloughed away; the alveolus would probably be partially closed or deformed on that side, then when the remains of the pulp resumes its function, the unequal development of the tusk and its extrusion through the constricted alveolus may cause it to assume the most fantastic shapes.

See Figs. 10, 10a, 10b, 10c, 10d.

It is not an uncommon thing to find where extensive suppuration has taken place. The pulp has made every effort possible to isolate itself from its pathological surroundings, which in many cases are held as it were in a reservoir in the tusk, these inflammatory products being unable to escape, without welling up and over the root of the tusk and down along the alveolar walls. This

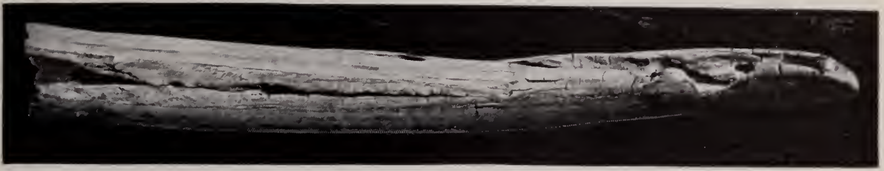

Fig. 21.

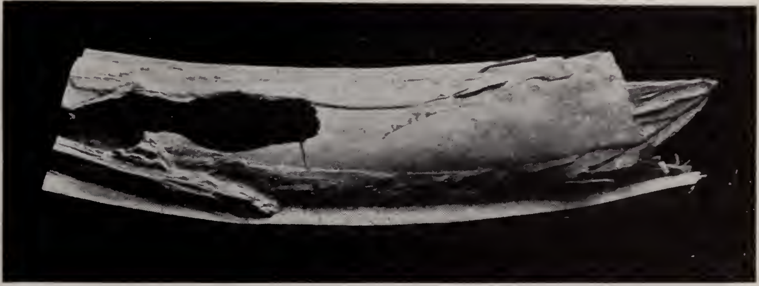

Fig. 22.

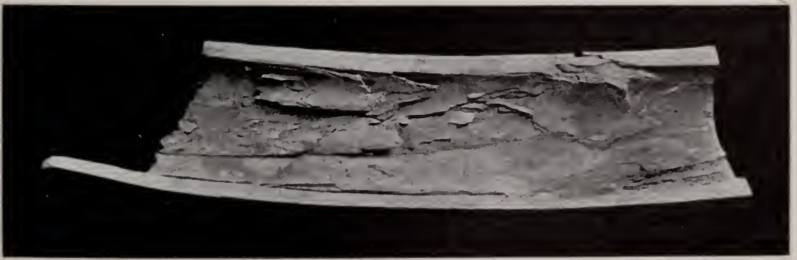

Fig. 22a

effort on the part of the pulp sometimes results in protective barriers being thrown across the lumen of the tusk. See Figs. 11, 11a.

In 11b we have an illustrative example of how the pulp will try to protect itself. Here we have a perfectly formed chamber, and while nature has not fully succeeded in the repair, the crater-like eminence shows the outlet of the sinus from the pus cavity below. We sometimes find the remains of the products of inflammation locked up in practically sealed cavities. See Fig. 12 and 12a.

In other cases the pulp throws out new tissue apparently with the view not only of strengthening the tusk but to close up the cavity produced by previous disintegration of tissue. The different densities of the new formation are very distinctly shown in Fig. 13.

You will notice the cancellated nature of the repair and its very close resemblance to bone.

Occasionally in otherwise perfect ivory, and where no trace of injury of any kind is discernible, isolated or grouped nodular calcified centers are found, of practically the same formation as the tissues found in secondary osseous deposits in connection with injuries elsewhere.

See Fig. 13a.

The cause or reason for these nodules is obscure, and must I fear remain so. Sometimes in pulps where there is no evidence of external injury we may find nodules of varying proportions. These may be somewhat likened to strings of beads fastened together in fantastic and irregular shapes. See. Fig. 14.

We may have nodular pulp formations which may take on almost gigantic proportions, being limited only in their development by the size of the tusk. See Figs. 15 and 16.

No. 15 was secured by a hunter near Lake Tchad, Central Africa, and was kindly presented to me by Sir George T. Goldie, who was for some considerable time governor of Nigeria. As far as I am aware these are the largest pulp nodules known, being nearly 18 inches in length, and from 6 to 8 inches in their greatest diameters.

Sometimes a tusk is proliferated in the inflammatory process following an injury. The pulp, even though exposed, may then continue its function, as illustrated by Figs. 17 and 18.

Here we have two instances of what is practically a nodular calcification to the extent of furnishing an entire new tusk. In Fig. 17 this secondary tusk, as we may call it, was undoubtedly in

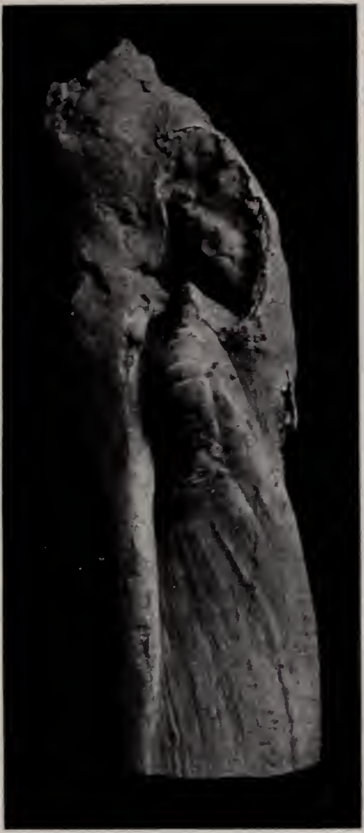

Fig. 23.

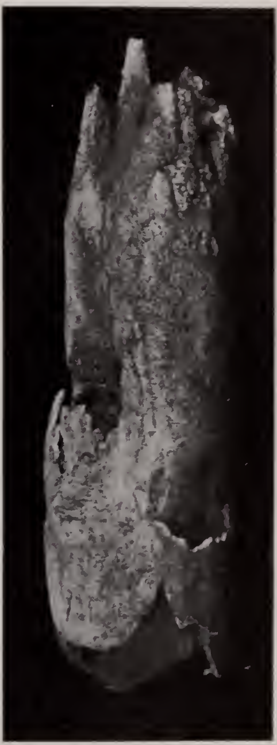

Fig. 24.

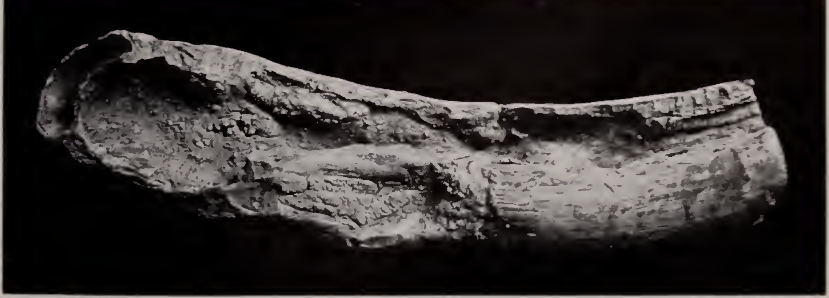

Fig. 25.

use for a great many years, as the end shows wear and stains incidental to prolonged use. In Fig. 18 we have an illustration of an injury to the new formation. The bullet wound may easily be seen, and it is interesting to note that the ravages of inflammation in this specimen are practically the same as those incidental to the primary organ under like conditions. These specimens I may also say are the largest of their kind with which I am acquainted.

Figs. 18a and 18b are also good illustrations of secondary formation. This is one of the most unique specimens I have seen; while one end is distinctly of a secondary nature, and shows very plainly the arrangement and different densities of the new tissue, the other end shows what appears to be a return to primary function on the part of the pulp, and the formation of which is indistinguishable from normal ivory.

Figs. 19 and 19a illustrate the effect of a gunshot wound causing sad havoc in hard tissue. The bullet produced great comminution at the point of entrance, passing through the pulp and striking the opposite wall of the pulp cavity; the impact there being the cause of the large bony tumor as shown in Fig. 19a. I thought it possible that the tumor might contain the bullet, but radiography disclosed nothing of a metallic nature.

I have found in cases of injury within the alveolus, and where there has been a barrier thrown out by the pulp, as already mentioned, that a peculiar supplemental formation of the external portion of the base of the tusk takes place, as illustrated in Figs. 20 and 20a.

This condition of affairs is analagous to the knurled and uneven condition incident to an injury to the matrix of the human nail. It is very rare that we find what may be termed a true necrosis in ivory, but in Fig. 21 we have something which I think is undoubtedly a necrotic condition. No other specimen that I have seen possessed the marked peculiarities as did this tusk.

A condition of affairs which is also unique in its way is shown in Figs. 22 and 22a.

Here we have a tusk, the outer portion of which was burst off by internal pressure from gas and pus. The straight edges shown are accounted for by my sawing it to entirely remove the outer casing, in order that the inside might be examined. That there was perfect disruption the specimen itself bears ample testimony. This was a comparatively fresh specimen when I received it, and

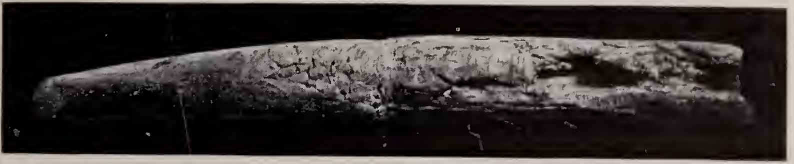

Fig. 25a.

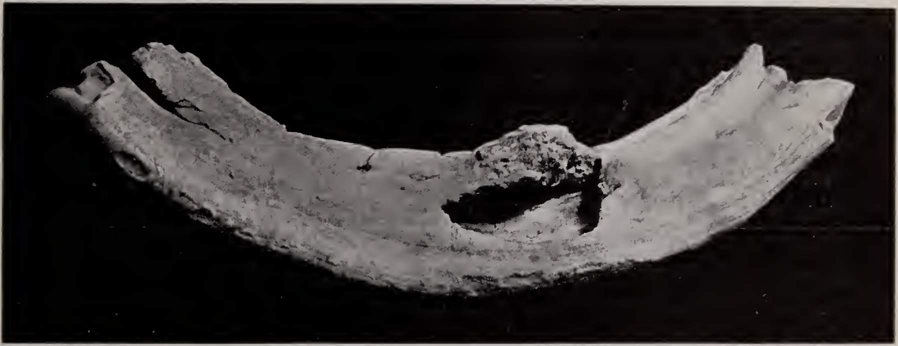

Fig. 26.

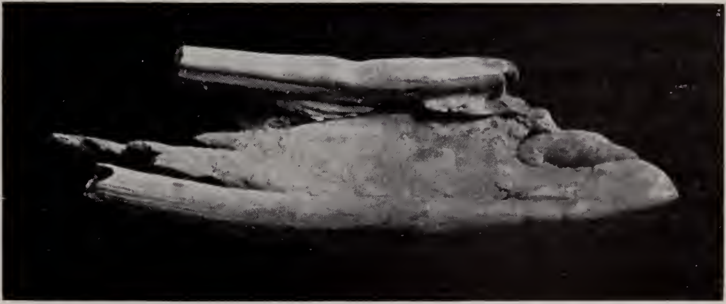

Fig. 27.

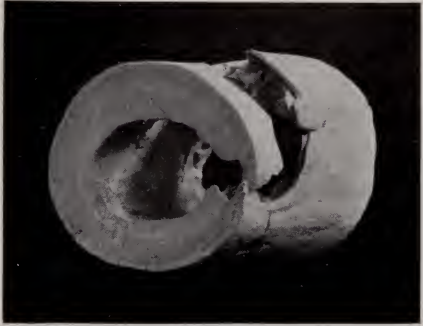

Fig. 28.

the odor arising from the permeation of the specimen, by the products which eventuated in its breaking up, was that with which I have no doubt you are all too unfortunately familiar.

Fig. 23 is a rather interesting specimen of secondary dentin, more perfectly organized than some of the previous specimens shown. The approximate length of this specimen can only be conjectured, but it was no doubt at least three feet in length. The cavities in this where disease was in evidence while the development of the opposite side was still in progress illustrates very well how many of the fantastic shapes already alluded to are produced.

Fig. 24 is an interesting specimen of what in ivory dealers' parlance is called "tripy ivory," the surface presenting the appearance of tripe, or like the surface of a bath towel. The numerous spiculæ upon its surface are undoubtedly due to a peculiar inflammatory condition of the pulp during the deposition of the new tissue going to make up their formation, but it is just possible that the softening effect of the fluid contents within the walls of the alveolus, of a broken down and ichorous nature, may have had much to do with producing this rough surface. It has been thought that ivory possesses no reparative capacity, except what may come direct from the pulp. This may be open to question, as illustrated by the two specimens which I will show you in Figs. 25 and 25a.

Here we have two green stick fractures in ivory which have become perfectly united. In the larger one, at the extreme left end, is shown the point of apposition of the dental pulp, which has, after a triple injury, i. e., one to the pulp, the green stick fracture, and the transverse terminal fracture, carried on the repair and development which has resulted in the production of a very large tusk

The specimen shown was over 8 inches in diameter, and must have been at least six feet in length. It having been broken during life, at the distal end, suggests that its possessor was undoubtedly a quarrelsome brute among its kind, and the wreckage shown was no doubt the result of a difference of opinion between him and a friend. In Fig. 25a we have an illustration of a united green stick fracture in the center of the specimen. The injury causing the fracture no doubt was the cause of the injury to the pulp which resulted in the broken up and excavated nature of the base of the tusk.

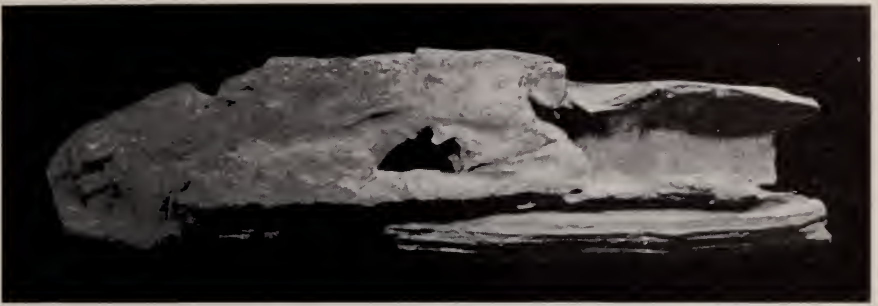

Fig. 29.

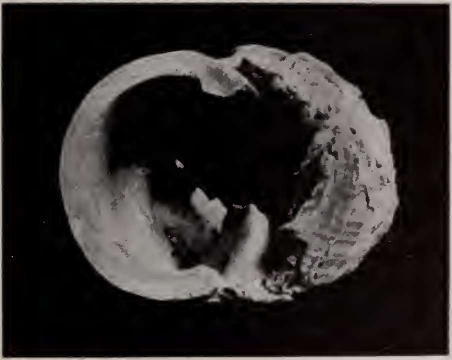

Fig. 30.

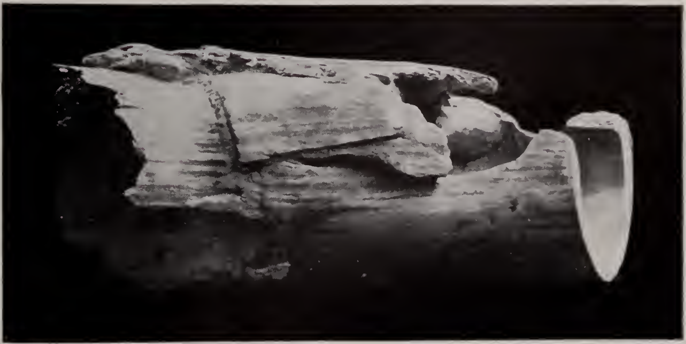

Fig. 31

Some illustrative phases of the injuries caused by bullets are shown in Figs. 26 to 31.

In some it will be seen that the process of repair has progressed very satisfactorily, in others the animal has met death before this process has been completed. The amount of tissue restored in many of these cases confirms what I said in prefacing this phase of the subject, as to the capacity of the dental pulp of the elephant for repairing injuries and replacing lost tissue. A microscopical examination of this new tissue, either the secondary deposit of a nodular nature, or that of a less complicated structure, shows it to be almost analagous to bone, in that it contains lacunæ, canaliculi and Haversian canals; so that for all practical purposes it is bone, and not ivory. Why the function of the pulp is so materially modified by an injury is a very interesting problem. I cannot do better than to advise any one who may be interested in this subject to look up and read very carefully a very interesting series of articles by Prof. Miller, published in the *Dental Cosmos* in 1890, where the histology of this very interesting subject is most admirably gone into. In conclusion I would say I have necessarily had to treat this matter in a very brief manner in order to bring it within the limit of an ordinary paper.

That much of the matter I have thus briefly presented to you affords opportunity for a deeper and more thorough investigation than I have been able to present in the time allotted to me goes without saying, but the fact that I have had to necessarily condense it is my apology for its incompleteness in what no doubt might have proved many very interesting details. If I have stimulated any one here to take up this subject and carry on the investigations that this field of comparative dental anatomy and pathology affords I shall feel well repaid.

PYORRHOEA ALVEOLARIS.*

By C. F. W. Bödecker, D. D. S., M. D. S., Berlin, Germany.

Like most of the authors who have written on this subject, I have to admit that this name is not altogether descriptive of the pathological process in question. But, when we consider terms like Rigg's disease, gingivitis expulsiva, cemento-periostitis, alveolitis infectiosa, phagedenic pericementitis, etc., etc., each expressing only one stage of the disease, we have to admit that the term pyorrhoea alveolaris, especially as it has been adopted by the majority of our profession, is preferable.

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*Read before the American Dental Society of Europe.

On the etiology of our subject much has been said and published. I should, therefore, deem it a waste of your valuable time to discuss all the different opinions of the authors found in our literature, which I doubt not, are familiar to most every one interested in the treatment of pyorrhoea alveolaris. I will, therefore, confine myself to a short statement, principally of my convictions about this disease, based upon the observations made in my practice, and then give a brief outline of my method of treatment, which has given me most satisfactory results.

Pyorrhoea alveolaris is sometimes confounded with a number of other diseases of the gums, as well as with atrophy of the alveolar portion of the jaws. The latter not only occurs in aged patients but is sometimes met with quite early in life. Many authors believe that the cause of pyorrhoea alveolaris is a local one, others claim it to be entirely constitutional, while my observations lead me to believe that in most instances both factors play a part. I have always regarded this disease, at least in its incipient stage, as an expression of some systemic disorder of which the patients themselves have often no knowledge. In the same manner as an absolutely healthy system is almost immune from an attack of the bacteria of infectious diseases so will a healthy pericementum and gum resist an infection of the pathogenic bacteria, which are usually present in every mouth. When the vital forces of the system are much depressed, the tissues of the body have less resistance, rendering them more favorable for the invasion and propagation of microorganisms. I claim, therefore, that, as long as the system retains its normal vitality, pyorrhoea alveolaris will not occur. The disease usually begins while the patient is suffering from some constitutional disturbance as, anemia, rheumatism, gout, influenza, diabetes, tuberculosis, syphilis, typhoid, chronic diseases of the nervous system, the heart, the liver or the kidneys, etc. Sometimes pyorrhoea alveolaris is the result of the administration of medicines such as arsenious acid, phosphorus, the salt of mercury, iodine, bromine and lead, or it may develop from local causes, such as faulty articulation of the teeth, foreign bodies pressed under the gum, careless regulating or wedging, badly fitting partial dentures, clasps, bridges, crowns, filling materials left under the gum, improper use of the toothbrush, or anything that will irritate or injure the pericementum or even loosen the festoons of the gum from their attachment to the necks of the teeth. As another cause of the disease in question I would mention pregnancy, although when it arises from this, it seldom needs much treatment except in a system with very low vitality. In the incipient stage of pyorrhoea alveolaris, when the gums encircling the necks of the teeth lose their attachment, an invasion of microörganisms into the tissue occurs, and as the organism is not in a normal state of health a *chronic* suppurative inflammation is the result. If, on the contrary, the resistance of the body is normal, any injury to the gums or even the pericementum produces an *acute* inflammation which, after the foreign body has been removed, will result in the healing by first intention or by *acute* suppuration. During inflammation the mucous membrane has the tendency to secrete an extra quantity of mucous. It is an acknowledged fact that lime salts always are deposited in a framework of mucous. This explains the formation of an excess of calculi whenever the gums become inflamed, and then we find these salts deposited upon the necks of the teeth as well as a certain distance under the gum. The formation of the so-called seruminal calculi found at the middle and sometimes at the apical portions of the roots of teeth, can hardly be explained as resultant from the saliva and we have to admit their derival from the blood.[1]

In some instances of pyorrhoea alveolaris we observe that the ends of roots of teeth which are quite loose are entirely covered with deposits, while at their middle portion we may find but little calculus. M. L. Rhein[2] has extracted an upper molar on which the pericementum around the neck of the tooth was in a normal condition, while the tips of the roots were covered by deposits, apparently proving that these calculi were deposited in that place without an established communication with the oral cavity. I am in the habit of closely examining all the teeth I extract, but I have never seen such a specimen, and if seruminal calculi are deposited at the ends of the roots without a communation leading to the margins of the gum, it is not quite explicable why we do not meet with such specimens more frequently. In some instances of pyorrhoea alveolaris we find in the pockets under the gum very little or no calculary deposits. I have noticed this condition mostly in patients suffering from wasting diseases, such as tuberculosis, anemia, etc. In those instances there is usually present a white, sticky, soft, mucoid deposit, called sordes, or white tartar, in white an abundance of microörganisms are found. We also observe this deposit in all cases of pyorrhoea alveolaris under treatment, although the time of its formation varies according to the care the patient bestows upon his mouth. Sordes usually reforms in from six to ten days after the first removal of the calculi, as well as after every treatment. Its formation gradually decreases with the disappearance of the inflammatory process in the pericementum and gums. As the disease advances it reaches the periosteum of the alveolus, disturbing the nutrition of the bone, which thereby becomes necrotic. Sometimes pyorrhoea alveolaris is accompanied by subperiosteal, so called false abscesses which arise in the same manner as abscesses and furuncles in other parts of the body, i. e., by an infection. I have noticed these abscesses mostly in the mouths of patients suffering from great nervous strain or whose constitution was much run down by chronic diseases. The abscesses usually make their appearance either on the lingual or the labial aspect of the alveolar process, starting in or beneath the periosteum. At first the inflammatory destruction is confined to the superficial portion of the alveolus; when, however, the abscess recurs, which it usually does, the alveolus becomes perforated and the inflammatory process extends into the pericementum, and later the cementum itself becomes involved. I always regard the prognosis of teeth affected with recurrent subperiosteal abscesses as doubtful. I have noticed that whenever these abscesses recur they cause, by an irritation of the myaline of the bone, an exuberant growth of granulation tissue (a granuloma), gradually absorbing the root of the tooth. Against this condition, as is well known, we have been unable to find a remedy.[3] I have frequently been successful in preserving such abscessed teeth, especially when I was able to remove the pulps and fill the canals soon after the first attack of the abscess, but usually in recurring cases the roots are gradually absorbed and either drop out or they become painful and have to be removed. The granuloma made up of the so-called "osteoclasts" absorbs the bone as well as the cementum in the form of bay-like excavations, leaving pointed excrescences between the bays, which, after the extraction of the tooth, are visible to the naked eye. Upon examination we find that the end of the absorbed root is beset with innumerable delicate, sharp processes. These pointed excrescences cannot be removed, and consequently are a mechanical irritation to the neighboring tissues every time the tooth is pressed upon by its opponent. This irritation stimulates the further growth of the granuloma until the tooth is lost. The secondary influences upon the pulps of the affected teeth are also at times serious. If the abscess recurs often, or becomes chronic the pulp of the tooth soon reacts by a chronic hyperplastic pulpitis, or an atrophy of its nerves and blood vessels is the result. As these diseases are very painful they usually lead to the loss of the tooth unless we are able to extirpate the pulp at an early stage of the disease. When chronic hyperplastic pulpitis or an atrophy of the pulp has existed for some time, the dentine usually becomes so sensitive that the mere touch of an instrument produces excruciating pain, making the removal of the pulp impossible. It seems to be the experience of most practitioners who have treated pyorrhoea alveolaris that teeth afflicted with an advanced stage of pyorrhoea promise better results when their pulps have been extirpated and their canals filled, and this opinion I fully corroborate. I have described and depicted the results of subperiosteal abscesses in my work on the Anatomy and Pathology of the Teeth, pages 407, 413 and 429 and Fig. 217 and 228. We also find some literature on this subject by I. Arkövy[4] and by E.C. Kirk.[5] Characteristic facts to be observed in the diagnosis of chronic hyperplastic pulpitis or in atrophy of the pulp are that the teeth become quite sensitive to thermal changes, especially to cold, while percussion and pressure then only give pain when directed to that portion of the root on which the subperiosteal abscess is situated. The color of the tooth remains normal, and unless very much loosened by the pyorrhoea alveolaris it is still tight in its socket.

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[1] H. H. Burchard. *Dental Cosmos,* Vol. XL.

[2] *Dental Cosmos,* Vol. XL.

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[3] Witzel. *New England Journal of Dentistry,* Vol. II.

In regard to the treatment of pyorrhoea alveolaris I will state that success mostly depends upon the ability of the operator. Any one who is able to detect and remove every particle of calculary deposit and necrotic tissue present will be successful in the treatment of the disease in question, although to become skillful much practice is required. Another necessity for the successful treatment of pyorrhoea alveolaris is that the practitioner is able to give the required amount of time and patience to it. In this respect I have to admit that during the last few years of my stay in New York, when I had to attend to my large practice and do scientific work besides, I had to give up the treatment of pyorrhoea alveolaris almost entirely. My first experience in the treatment of this disease dates back to 1873 (I think), at the time when Riggs gave a clinic in Brooklyn and when W. H. Atkinson introduced the use of aromatic sulphuric acid for dissolving necrotic bone. I then had several patients afflicted with pyorrhoea alveolaris, in the treatment of which Atkinson assisted me, making use of the aromatic sulph. acid, tincture of iodine, chloride of zinc and iodide of zinc. One of these patients, whose treatment was quite successful, was exhibited at the clinic of the First District Dental Society of New York. Still another matter of great importance to be considered in the treatment of pyorrhoea alveolaris is the necessity of the thorough coöperation of the patient. If a patient is unable or unwilling to follow our directions in keeping the mouth as clean as possible, the treatment is certain to be unsuccessful, whatever care we may have bestowed upon it. We have some patients who pay the utmost attention to the cleanliness of their mouths, and in these instances it is a pleasure, unless they are in bad health, to observe how rapidly the cure progresses. Others, who are not so particular, often require more than double the time to affect a cure, while a few patients who completely neglect the rules of oral hygiene, are usually incurable. Many authors claim that to be successful in the treatment of pyorrhoea alveolaris the practitioner ought to have had a good medical education, and I must admit that such a knowledge is of great value in the treatment and diagnosis of this disease as well as in every pathological condition of the mouth, but I do not consider it an absolute necessity. Though in the search for the cause of pyorrhoea alveolaris a full medical education will be of great assistance, yet I do not think that any dental practitioner should or ought to treat his patient for a systemic disease. The treatment of such diseases should be referred to the family physician. In severe cases of pyorrhoea, when the patients are not aware of any disturbance in their system, I always consult with their family physician and leave the general treatment to him. I also have to acknowledge that in the cases in which there is one of the above named systemic diseases present, a complete cure of the pyorrhoea is not always possible as long as the disease lasts, yet usually we are able to cure it by local treatment so far, that the destructive inflammatory process around the teeth is checked. Whenever an exacerbation of the systemic disease occurs, it again leads to disturbed nutrition in the oral cavity and usually a reappearance of the pyorrhoea is the result. Fortunately, in the majority of instances, the systemic depression which caused the pyorrhoea alveolaris has been but temporary and in these instances, if the treatment has been correct, we will always be successful. By a successful cure of a case of pyorrhoea alveolaris, I understand, the complete disappearnace of pus and all inflammatory conditions around the teeth. The gums must be attached again to the necks or roots of the teeth, and offer a fair resistance to the introduction of a moderately fine instrument, even in those places which formerly were occupied by the so-called pockets. In advanced cases where much of the alveolar process has been destroyed by the inflammation, the teeth will have an elongated appearance and remain loose for some time, till a portion of the lost bone has been reformed, but the alveolar process will never regain its original heights. When the teeth are too loose to be left without a support, I either apply a retaining apparatus or tie them by means of fine silk ligatures, which W. J..Younger had the kindness to show me and to whom I am greatly indebted. I believe in saving the natural teeth whenever I can and it distresses me to admit the fact that I am unable to save a tooth. I do not want to be understood that I can, or do save every tooth, but I try to save whatever I can. As long as the root of the tooth has not been absorbed and has yet some pericemental attachment, however loose it may appear, I usually succeed in saving it.

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[4] Diagnostic der Zahnkrankheiten. Stuttgart, 1885.

[5] *Dental Cosmos*, Vol. XL., page 621.

As every one who has been successful in the treatment of pyorrhoea alveolaris I regard the thorough removal of every particle of calcarious deposits and necrotic tissues of the utmost importance. The application of medicines, whatever they may be, are of no value whatsoever unless all the deposits have previously been removed from the roots of the teeth. When more than six or eight teeth in the mouth are affected, I do not as a rule attempt to remove all the deposits at one sitting, which I never extend over one hour. Throughout the course of treatment I see the patient once a week. The reason for this interval of time will be explained hereafter.

Contrary to the views of some, I am not in favor of removing much of the necrotic bone at once, as it is impossible to determine by the sense of touch or sight how far the necrosis extends into the healthy bone tissue. If the formation of pus still continues three or four weeks after the removal of the calculi, it is a certain sign that either some calculi or necrotic tissues are left upon or in the surroundings of the roots of those teeth. In these instances if a careful examination reveals the presence of necrotic bone, I usually remove of it whatever I think necessary by means of spoon excavators or burs in the engine. In removing the calculary deposits, which requires a keen sense of touch, great patience and much practice, I make use of some scalers of almost every set found in the dental depots, excavators, burs or any instrument that will reach the required place with the least pain and laceration of the soft tissues.

To lessen the pain during the operation of severe cases I make use of a concentrated, syrupy solution of cocaine phenate, which I apply under the gum for about four to five minutes upon a small piece of cotton. This solution I have found to be the safest of all the cocaine solutions and mixtures I have ever employed. The carbolic acid of this preparation to a certain extent prevents the cocaine from being absorbed, while the cocaine, as long as the solution is saturated, inhibits the caustic action of the carbolic acid. When the calculary deposits have been removed and the pockets have been rinsed out with warm water and a suitable antiseptic, an application ought to be made of some medicine which will stimulate a new growth of the tissues surrounding the loosened teeth. For this purpose many remedies have been recommended, but the writer at present only makes use of three of them, viz: lactic acid, trichloracetic acid and iodide of zinc. Lactic acid, which has been recommended especially by W. J. Younger, I only employ in severe cases where there is much necrosis of the alveolus present, and where I desire a powerful hyperplastic inflammatory reaction, which at the same time will separate the necrotic bone from the healthy tissue. For this purpose I make use of the acid in full strength, injecting it as a rule not more than once during the treatment, by means of an all glass syringe with a platinum point. This I insert into the pocket of the gum as far as it will go. The action of concentrated lactic acid upon the tissues is quite irritating, and precautions must be taken that it does not touch the gum, lips or tongue. This can easily be accomplished by placing a roll of cotton on either side of the tooth where the injection is to be made. The introduction of lactic acid under the gum is quite painful and whenever I employ it I obtund the surroundings by cocaine phenate. Trichloracetic acid is obtained in the form of needle shaped crystals, and as this acid is quite hygroscopic, it readily liquefies when exposed to air. In this condition it is a powerful caustic, promoting healthy granulations and to a certain extent dissolving the calculi. Most practitioners use this acid in weak solutions, injecting it into the pockets of the gum, others employ it in full strength by means of fine pieces of orange wood, while I apply it still in another manner, to be described hereafter. Iodide of zinc is another remedy which acts admirably in all inflammatory conditions of the gums depending upon the presence of sordes. In instances where we observe no pus and little solid calculus upon the necks of the teeth, a condition always noticed after constitutional diseases, such as typhoid, etc., and also in the treatment of those sensitive conditions of the necks of teeth, present after the applications of trichloracetic acid when the pyorrhoea alveolaris is almost cured this medicament is invaluable.

As mentioned before we notice that in all inflammatory conditions of the gums, sordes accumulate very quickly even in mouths which are kept moderately clean. Such deposits occur especially on those places which are not disturbed by mastication, circulation of saliva or the toothbrush. If we examine the necks of teeth about a week after we have thoroughly removed all deposits, we will observe a little accumulation of sordes again, however careful the patient may have been in cleaning his teeth. For the purpose of examining the necks and roots of the teeth in regard to their cleanliness I take a few fibers of cotton which I wind tightly around a thin nerve canal plugger and with this I rub somewhat hard around the neck of the tooth. When we examine the cotton on the point of the instrument, we usually find it to be covered with sordes. This proves, unless the gum becomes somewhat attached immediately after the first operation, that a deposit of sordes will again form in about a week's time. Recognizing the fact that no wound can heal which contains such deposits I adopted the following treatment:

After the removal of the calculary deposits, I make an application either of lactic or trichloracetic acid. For the latter I employ the same nerve canal instrument as for an examination in the manner before stated. I tightly wind a few fibers of cotton around the point and dip this into the acid. Care must, however, be exercised not to use too much cotton or to wind it too loosely around the instrument as it takes up too much of the trichloracetic acid. Thus, instead of acting locally as desired, it runs into the mouth, injuring the mucous membrane and if swallowed causes serious disturbances of the stomach.

In applying the trichloracetic acid I introduce the point of the instrument covered with cotton as far under the gum as it will go, with moderate pressure, and then rub with considerable force against and around the neck and root of the affected tooth, thus wiping out all necrotic tissues as well as the freshly accumulated sordes and even the remains of small fragments of hard calculi. This process I repeat about once a week during the whole treatment. I then instruct my patient to rinse out all the pockets and interstices between the teeth at least twice or three times a day with a powerful syringe and electrozone diluted with about eighty or ninety parts of warm water. Electrozone, which is nonpoisonous, is made by passing a current of electricity through sea or salt water, and has given me more satisfaction than any other antiseptic, but it has two bad qualities which I have to mention here. In some mouths, and especially when the patients have employed it in the pure state, it forms a brownish, sticky deposit upon the teeth, which sometimes becomes quite dark, while another objection is its disagreeable taste. In regard to the bad taste of the electrozone, I have to state that most of the patients easily become accustomed to it. The brownish deposit, however, in some instances adheres so strongly to the teeth that at times I am obliged to remove it by means of scalers. The discoloration, however, is never permanent, as the teeth after polishing always show their original color. If the patient's health is not too greatly depressed, and the directions of keeping the mouth clean are carried out, I always expect to see the inflammation surrounding the teeth subside in from two to four weeks after the first removal of the calculi.

Subperiosteal, or blind abscesses, as mentioned before, are frequently met with in the mouths of patients suffering from pyorrhoea alveolaris, and as they are not caused by the presence of septic matter in a pulp canal they require different treatment. I have noticed that they occur more frequently upon the labial and buccal surfaces, than upon the lingual surfaces of the alveolus, and in the majority of instances the pus finds its way along the neck of the tooth into the mouth. Whenever these abscesses require to be opened I accomplish it by means of a fine nerve canal plugger, around which I wind a few fibers of cotton, dipped into phenate of cocaine. The instrument is gradually introduced along the neck of the tooth into the abscess. If treated in this manner it gives but little pain. There being no open wound on the gum where the particles of food can enter, the abscess heals readily and unless it recurs gives no more trouble. Sometimes I have seen these abscesses opened by cutting in the direction of the axis of the tooth, dividing the free margin of the gum, a procedure which will, after the healing of the abscess, permanently expose the neck and a part of the root of the tooth. In most instances these abscesses recur and such teeth are eventually lost by the absorption of their roots. The pulp usually remains alive in the tooth after the occurrence of a subperiosteal abscess, and I believe it exerts an influence upon the recurrence. I have noticed that, whenever I have been able to extirpate the pulp of the tooth and fill the canal satisfactorily, the abscess seldom recurred. In this respect I have also observed that applications of arsenious acid have little affect upon the pulps. There is usually present, through the inflammatory reaction of the abscess, a chronic hyperplastic pulpitis. The dentine in these instances is often extremely sensitive to the action of the bur and sometimes to such an extent that the patients are unable to bear the pain of opening the pulp chamber. I have of late made use of the Bauschwitz apparatus, which I employ for obtunding all sensitive cavities; and in the majority of instances it has given me great satisfaction. The apparatus consists of a cylinder containing carbonic dioxide gas, which is heated by an electric current to about 50 degrees Celcius while the gas passes through the handpiece and is directed into the cavity of the tooth. For this purpose the tooth has to be laid dry by the rubber dam or by other means. Before the carbonic dioxide gas is introduced a drop of diluted sulphuric acid, from five to ten per cent in strength, is applied. In this manner I have been able to open the pulp chambers of the teeth with but little pain, although I have to admit that I have met with some teeth where the apparatus has failed to work satisfactorily. When I have opened the pulp chamber of the tooth I inject an aqueous solution of cocaine hydrochlorid and after waiting about five minutes there usually is but little pain in removing the pulp.

SURGERY OF THE PALATE.*

By Dr. Truman W. Brophy, Chicago, Ill.

Mr. President and Gentlemen: When the president of the American Dental Society of Europe requested me last summer to do something at this meeting I hesitated to comply because I questioned the propriety of occupying the time of this association with a subject in which I believed only a minority was especially interested, but the presence of so many here this afternoon is evidence to me that the subject of the surgery of the palate is of far more interest to you than I anticipated.

This subject has occupied the minds of the most distinguished surgeons from the beginning of time, and in the estimation of many it has been regarded as an operation of great uncertainty. It is not too much to say that many of our most distinguished men in the field of surgery have hesitated to make these operations because they were attended with so many failures and the object desired was too frequently not attained.

In the first picture projected upon the screen you will see the usual form of cleft of the hard and soft palate in an adult. You will observe one characteristic which is almost constant—viz., that the fissure leading out to the anterior alveolar plate is upon the left side. I think it is safe to say that in 85 or 90 per cent of all cases of cleft palate with unilateral harelip we find that the fissure is on the left side. Why, I do not know. Perhaps some of the physiologists here may be able to say. There is only one ground upon which we may account for this, and that is the possibility of the lack of the same degree of nutrition upon the left side in embryo.

The next picture shows another form of cleft palate which is often seen and which is illustrated in Professor Kingsley's most excellent work on the subject. This is a cleft extending through the entire soft palate and the horizontal plates of the palate bones and into the palatal plates of the maxillary bones. In such cases an operation is much better than the adjustment of an artificial palate such as Professor Kingsley has suggested.

I regard this next picture as the most valuable one I have in this special collection. I propose to show you by this plate that the lateral incisions which were made by various operators, first by

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*Abstract of Lecture delivered before the American Dental Society of Europe, August, 1902.

Sir William Fergusson and latterly in our own country by Professor Agnew, with the view of relieving the tension on the palate, are in almost all cases unnecessary. They are unnecessary because using the plan here illustrated we make use of the curved periosteotomes dividing the muco-periosteum along the border of the bone well up toward the nasal surface and carefully carrying the instrument around close to the bone, denuding the parts of the periosteum so as to reduce the elevation of the arch, making out of a very high vault a normal vault or one more nearly normal. This not only enables us to get sufficient tissue to close up the space between the two sides, but it makes a better palate, which enables the patient to properly articulate. Men who have extremely high palates do not speak with the same distinctness as those who have ordinary elevation of the palate. Having denuded the bone of the muco-periosteum, we find that by picking it with the forceps and bridging it over it reaches the opposite side, but when we come to the distal part we find it clings to the surface, and the surgeon says, "We will make an incision to relieve the tension and enable us to bring into proximity the borders of the cleft and thus secure union." If he pursues the course here outlined he will lift up the parts and cut away the muco-periosteum, carrying the incisions back far enough to divide it almost to the alveolar border. This enables him to carry the parts over with the greatest of ease, to drop the palate back from the position which it formerly occupied until it drops downward and backward and approaches the distal border of the pharyngeal wall, and approximates with the surfaces similarly treated on the opposite side. He finds that the tissues are not yet denuded along the muco-periosteum; they are partially separated, but not sufficient to enable them to get union. Therefore he removes a thin paring of the tissues, but when he has approached the muscular part of the palate he does not remove any tissue, but splits the cleft edges of the velum until he has carried the incision down to the tip of the uvula. Having been divided, the edges separate and leave a gaping wound, which, when brought into contact with the surface of the opposite side, similarly treated, will enable us to secure union without the removal of any tissue whatever. There are further objections to the making of incisions in the line usually made by operators. We get as a result of an incision in that location a broad gaping, which will close, it is true, by the formation of granulations, but we have instead of the normal palate tissue a mass of granulations and subsequently cicatricial tissue, and it no longer serves the purpose for which the palate was intended. It will no longer vibrate, move up and down and retract in the way it should, but remains an almost inflexible mass.

Dr. Kingsley and others who have given this matter a great deal of thought have insisted that in the construction of the artificial palate enough material must be put in to reduce the elevation of the vault, as they regard the reduction of the elevation of these high vaults as an essential factor in distinct enunciation. So that without knowing much about the methods they advocate, I saw the propriety of saving the tissue in order to get union, carrying away the periosteum with the view not only of lowering the vault to its proper elevation, but to generate new bone. When we have carried these parts into proximity by the use of strong silver wire sutures carried far back from the palate on either side and fixed by the use of plates, twisting the wires together and bringing the surfaces in contact, and then finally making use of sutures within the median line to hold the parts together, we get as a result a deposit of new bone and a fixation of the parts until the process of repair is completed. Some one may say, What becomes of this great space between the muco-periosteum and the old bone? As the formation of bone takes place here it produces a good hard palate and probably the upper surface is filled with connective tissue; in any event it causes no trouble afterward.

The next picture shows the plates, and when adjusted we have no difficulty in carrying the sutures exactly where we want them. I find that silver wire serves my purpose better than silk ligatures, because the tissues tolerate it so well. These plates serve two very important purposes—they act as a means of preventing the sutures cutting out, which is one of the great drawbacks in this special operation, and the plate also serves as a splint. In compliance with an old law in surgery, which will always exist, when a part is in an abnormal state, put it at rest. By the use of this plate we are able to put the parts to rest and the palate is fixed as a rigid mass, and it must remain comparatively quiet until the union is effected.

The next slide shows another step. The coaptation sutures have been adjusted and I would suggest that they be adjusted before the plates are carried to place, because often a needle may come through beneath the plate and cause considerable inconvenience.

Surgery of the palate is divided really into three different operations, the first, operation upon the hard and soft palates; second, the operation upon palates that are too short by utilizing the palato-pharyngeal muscles as a substitute for the plate tissues, and thirdly, what should be the first, operations upon infants, and at a time when I believe most of these operations should be performed.

Here is an illustration of a drawing taken from life of a defective palate which was restored by the lifting up of the palato-pharyngeal muscles. The patient for whom this was done had an artificial velum made, but it was constantly wearing out, as such artificial appliances always do, and he thought an operation would be better. The operation was performed by me, and it not only served the purpose of closing the pharyngeal opening, but enabled him to speak better than he could do with the artificial velum.

Now we come to another feature of palatal surgery, and what I consider the most important one, the transfixing of the maxillary bones in early infancy and the uniting of the palate long before the patient is conscious of the fact and long before it has acquired faulty habits of speech. This is a longitudinal section of the bone, the antrum, which in early infancy is no larger than a grain of wheat and often almost absent.

Some may say, Is not this difficult to do? Is it not likely to result in deformity or make an abnormally narrow upper jaw? Theoretically, without a knowledge of the facts, we answer that quite likely it will. That was the answer I gave for a number of years, until I had an opportunity of seeing the development of these patients after operations, and then I was convinced that the theory held was erroneous. I devoted fifteen years to the study of this subject before it occurred to me that the upper jaw is very much wider than the lower in children having cleft palates. The question naturally arises, Why is this so? I have to confess I did not realize the upper jaw was so much wider until I began to study the question more carefully. You will observe that the difference in the breadth of the upper jaw as compared with the lower is just about the difference between the borders of the fissure. When this fissure is obliterated by bringing the bones together and uniting the parts we shall find that the size corresponds more nearly to that of the lower jaw. Sometimes there is an absence of all the tissues forming the palate, but these cases are extremely rare. In the early embryo we find all have cleft palates and up to about the fifth month of gestation the separation is present in all.

Here is the cast of a patient of mine, a boy of nine, showing a cleft palate and the difference between the breadth of the upper jaw and the breadth of the lower.

LOWER ARTIFICIAL PLATES.

By Dr. Edward H. Bowne, Kingston, N. J.

A set of artificial teeth for the lower jaw seems to be considered the *bete noire* of prosthetic dentistry by some practitioners.

However, more than thirty years' continuous practice has convinced the writer that a well *adjusted* and *articulated* lower denture may be made to work perfectly and satisfactorily to the wearer thereof. All lower plates made by the writer are heavily loaded with *tin,* and the teeth are very carefully articulated and plates cut away to avoid undue irritation to the soft parts of the lower jaw.

Instructions are given to *each* patient that *persistent* wearing of the plate will in time make it as perfect as an upper denture.

When my advice is heeded and instructions followed it is astonishing how quickly patients can use the teeth, with comfort and satisfaction in mastication.

The advice of that veteran and able practitioner of prosthetic dentistry, Dr. Haskell, of Chicago, to young dentists, and old ones too, for that matter, in adjusting lower dentures to cut and cut, until they think they have spoiled the plate, and then cut a little more and the plate will be right, is correct in principle and practice.

The writer has a number of patients, seventy years of age and upward, who are wearing double dentures "almost" with absolute comfort and satisfaction.

In case upper plate needs repairing the venerable patient wears the lower denture until the upper plate is repaired and adjusted to the mouth again.

Hence, the practical experience of the writer is, in regard to lower dentures, summed up concisely and briefly, that persistent wearing, and loaded plates skillfully adjusted, make perfect work. substantially in every mouth, young or old alike, whether the mouth is flat or with a well defined ridge, time making a flat process plate as perfect as a ridge one with persistent wearing.

PUBLISHED DENTAL SOCIETY PROCEEDINGS—WHO IS RESPONSIBLE FOR THEIR SHORT-COMINGS?

By William H. Trueman, D. D. S., Philadelphia, Pa.

The editorial in the November Dental Review (1902), entitled "Society Proceedings," pointedly invites attention to a much neglected phase of dental society work, and raises the question, Who is responsible for their acknowledged imperfections?

The editor explains that there is a limit which it is unwise to overstep by making the proceedings conform to his idea of what they should be; and furthermore, when pruning and radical changes are most needed he is more likely to be censured than thanked were he to revise as his judgment dictated. This is all undoubtedly true, but the editor errs, I think, in not placing the blame where it properly belongs. In this year of grace, 1902, there is no excuse for any dental society sending their proceedings to a dental journal for publication so carelessly written as to need any serious editorial revision. Surely there must be in every dental society in the land at least one member sufficiently interested in his society's reputation to properly prepare its proceedings for publication, some one with sufficient education to avoid glaring errors in grammar and construction, some one sufficiently posted in modern professional phraseology to frame in proper language the debaters' ideas, tersely and correctly. By frequent association and intercourse, such a one will soon learn to boil down, correct and properly indict his fellow members' remarks, without destroying that individuality which characterizes the different speakers, far better than can the editor of a journal to whom every member of the society may be a stranger.

If members of dental societies recognized and appreciated that the reputation of their society, its educational standing in the profession and the community is formed by reading its published proceedings, they would have, it is to be hoped, sufficient pride and self-respect to see to it that they are put in proper shape before leaving their jurisdiction.

When they contain so much that may be justly criticised after the editor has corrected all he feels free to change, what was their condition when sent to him?

The published proceedings of some societies are models of excellence, and as these are not confined to any one journal, but are frequently found in the same number with examples of gross carelessness, it is fair to infer that the credit and the disgrace belongs to the society from which they originate.

I say "the society," for it is the society and not its individual members that speaks through its published proceedings. If these are marred by ungrammatical expressions, if the speakers "kill nerves," describe how they fill cavities in the back-side of wisdom teeth, talk of eye teeth and stomach teeth, or are unable to intelligibly express their ideas, that society stands, educationally, where such expressions pass current.

During the meeting, such errors as a speaker suddenly called upon to express an opinion or to relate experience is liable to make are quite excusable; they are seldom noticed, and are common to all. The speaker may be verbose, and yet surrounding circumstances may call for every word uttered. A speaker may, in his embarrassment, while seeking words to express ideas, literally "murder the King's English," while at other times his speech may be fluent and correct. Words may now and again slip out, during debate, more expressive than chaste; a joke will now and again prove as a "nail in a sure place" to fix an idea, and a little pleasantry will occasionally wonderfully enliven a dull dental meeting, yet, on the printed page they awaken far different sentiments, and are thoroughy out of place.

The society's reporter, if he understands his business, will appreciate all this, and will, when preparing his report, correct the excusable errors; he will condense, and in so doing make the "long-winded" remarks intelligible to those not present; he will straighten out the grammar, correct faulty and unfortunate expressions, and will be very chary of the jokes and pleasantry. In a word, he will so write the report that it will read well and smoothly a hundred years from now, and will be a credit to his society, his fellows, and his profession; he will do all this, keeping himself and his ideas so far in the back-ground, that the individuality of each speaker will remain unimpaired. This has been done, and is being done by a few societies. Those who are not so doing need rousing up to the importance of showing themselves worthy of being considered members of a learned profession, and ceasing to be examples of an illiteracy they are so fond of condemning.

The temptation is very strong to quote a few examples of inexcusable society reporting, with the journal, volume and page where they can be found—a drastic measure that may come later.

Why cannot each society have a publication committee who are charged with the duty of properly preparing their proceedings? Let this committee take the stenographer's report as a ground-work, using it only as a record, and write from it a well connected story of such portions of the meeting's proceedings as are of general interest, omitting all that is of interest only to the speakers and their immediate friends, and adding that which is needed to properly present the ideas brought out. Such a committee would prove to many of very great educational value, provided, of course, that they themselves were educated, up-to-date men. They could do very much to make uniform our profession's technical expressions by making them, as they occur in the report, conform to recognized standards. The man who talks of the back-side of a wisdom tooth would probably take the hint and drop the expression after seeing it in the published report translated into the "distal surface of the third molar."

I do not appreciate the importance of keeping closely to the speaker's very words, or the order of his remarks, not even after he has corrected or rewritten them. It is his right that his ideas shall not be changed, although the reporter may feel very sure that he is wrong; there are certain expressions that, while correct, are unusual and belong to the individual; it is his right that these should be retained; but, if changing the order in which his ideas were presented makes a more connected and intelligible story, or reframing, completing, or shortening his sentences makes better English construction, I see no reason why this should not be done. The readers of the report and the subscribers to the journal in which they are published have rights as well as the speakers; the society's reputation and that of the profession is also at stake. The reporter has no right to sacrifice these to please the whim or fancy of one who prides himself on doing things educated gentlemen never do, nor yet has he any business to perpetuate in print errors due to ignorance or embarrassment, because he finds them in the stenographer's report.

In conclusion I repeat, and wish to emphasize, no society has any right to impose upon the editor of a journal the duty of correcting and making presentable its proceedings. They should go to him as well and as carefully written, and as ready for the printer as should be an individual's paper. If the society is unable to so prepare them, they need, and need badly, the services of a village schoolmaster. For the credit of the profession, the published proceedings of some societies claiming high rank, had far better have been burned than printed.

THE PERSONAL HABITS OF THE DENTIST.*

By M. R. Harned, D. D. S., Rockford, Ill.

In presenting a treatise upon this subject it seems rather necessary to find an excuse for so doing, because of the generally conceded principle that "It is a good plan to mind your own business," and "Every one has the right to live as he sees fit." "Mind your business and I'll mind mine."

Now, if this philosophy is true, to criticise any man's habits of living is meddling with another's business, an attempt to force upon him ideals of my own for selfish purposes.

Thus arises the question, "What right, if any, has one person to criticise the habits and life of another?" For answer I will state that one of the inheritances and responsibilities of the present and all future generations is civilization; but what is civilization? Is it education? Yes, and more, for it recognizes other forms of education as well as ours. Is it refinement? Yes, that refinement which does not exclude, but comprehends all refinement which in some form, is possessed by all. Is it good government? No, good government is the result of civilization, and in proportion to the justice and equity of a government of a people, can you judge of their civilization.

Civilization is a recognition of the universal rights of humanity, together with the living which is conducive to culture and refinement. It is the result and outgrowth of living in a community and recognizing the rights of others. Hence, whatever in my life is conducive to the happiness, health or general welfare of society is good, and follows the lines of civilization, but whatever in my life is detrimental to self or others is wrong and may be justly criticised, for whether we recognize it or not, we are working out our salvation. If one tears down that which is good it must be rebuilt.

There is about us an environment which we call society, from which we cannot escape, and in every act we should consider this great dependence. If one does that which makes others uncomfortable he must concede the right of others to retaliate. If I blow tobacco smoke in a lady's face and make her sick I should not complain if a man gets drunk, runs into me and breaks my arm; both will get well, the damage is only a matter of degree.

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*Read before the Northern Illinois Dental Society.

On this broad ethical ground of interdependence I offer the following suggestions:

Habits are the outgrowth of continuous practices, which become fixed in our lives and make our atmosphere. By and through them very largely we exert our influences.

The most natural division of the subject seems to me to be, 1st, Habits of thinking, expressed through our ideas in religion, ethics and politics; 2d, habits of living expressed in action. They are so interdependent, however, that one will necessarily influence the other.

Thoughts are things, and measured as other potentialities are, they make the greatest force of nature; but on account of their subtlety are not usually reckoned with, and that is the reason for a great number of failures. "As a man thinks so is he" is true and it might also be added, "so will he be to others."

As a man thinks of his God, of his fellow man and of his country, so does he become godly or fiendish, a brother or an alien, a supporter or a disturber.

Religion is not an habitual performance but living and striving for an ideal. Ethics is not law and order but a strife for ideal or real equity. Politics is not a strife for office and emolument but a strife for just government.

Some say it is foolish to think and talk of these things, but I believe the more we think and talk of them the sooner will they be realized, for we thereby create a proper sentiment. Emerson says, "The only sin is limitation," so let us not limit our aspirations for in reality the helm which guides every man is his thought, his ideal. If you wish to reform him you must change his thought, replace it by a higher and better ideal, and stern and sturdy as he looks, his course will be changed.

The danger to a man is that his thought habit becomes limited, thus limiting his ideal; having attained what he once idealized (usually money) he becomes hopelessly limited, but being a self-made man has a great admiration for his maker.

Habits of thinking of course influence our habits of living, particularly does it influence our conversation. What a resource the dentist has in this respect to be helpful to humanity often being able to do a patient much more good by this means than by professional services rendered, for much of the time you know we have it all our own way and can fill their minds with less discomfort than their teeth. As a patient once said to me after finishing a rather lengthy operation that he, having listened to my argument clear through, would concede that I was right, but that if he could have done so would have questioned it in many of its parts.

Buckle, the English historian, divides people into three classes, lower, middle and higher, and says, "The lower class talk of persons, the middle class of things, and the higher class talk of ideals." I fear we often find ourselves in the lower class.

My suggestion for conversation for a dentist would be to have the mind so generally stored that he may converse intelligently upon most any subject; then he will be able to talk of that in which his patient is interested. The dentist should be educated, cultured, refined, but never to the extent of making him feel that he is an aristocrat, or superior, but has simply had superior advantages. He should feel that he is just like other men plus improved opportunity. This makes his advantages responsibilities, it makes him kind and considerate of all, and the spirit of kindness becomes a habit.

A dentist should be honest and conscientious, both in rendering faithful service, and under the present system, charging a remunerative price for such service. One of our temptations to be dishonest is in our honest desire to do a mechanically correct operation, regardless of the endurance of either patient or ourselves, and we are thus frequently unjust to both.

And then the dentist should be *clean.* I recognize the fact that cleanliness is only a relative term though, and that the man who takes a bath every year "whether he needs it or not" is clean compared with the fellow who never takes one. But the dentist should be clean just as far as he knows what cleanliness is. Morally he should be above reproach, mentally he should be equipped with the highest ideals, and physically he should be immaculate.

No dentist has a right to thrust soiled hands into a patient's mouth and charge for the service; no dentist has a right to keep his person so negligently that the atmosphere about him is pregnated with odors of his filth. No dentist has a right to breathe into his patient's face a breath saturated with tobacco, liquor, onions, garlic, catarrh or indigestion, and unconsciousness of the condition is not a valid excuse; it is his duty to know his condition and keep it right.

But some one says these are what we should expect of all men; yes, it is true, but first we should expect it of those who have had the advantages of knowing what is right and best and knowing how to keep so, and the dentists are the ones who know; they are the leaders, or should be.

And then, as we possess all these excellent attributes and habits, we will necessarily have good manners. Emerson says, "Defect in manners is usually the defect of fine perceptions." Manners need not be profuse and formal, but easy and courteous; after all the best manners come from a high regard and kindly feeling toward our fellow man.

Now I recognize the fact that all this is old, even if ideal; that it is rather distasteful, for to quote from Miss Addams' "Democracy and Social Ethics," "In the range of individual morals, we have learned to distrust him who would reach spirituality by simply renouncing the world, or by merely speculating upon its evils. The result as well as the process of virtues attained by repression, has become distasteful to us. When the entire moral energy of an individual goes into the cultivation of personal integrity, we all know how unlovely the result may become. The character is upright of course, but too coated over with the result of its own endeavor to be attractive."

So the strife for right habits should not be for personal beauty, or from a sense of personal pride, but with the idea of doing our part to make for refinement and culture.

My experience is that after attending a dental convention I feel enthused to be a better dentist and citizen, and so my hope in going over this old ground is to stimulate the ideal sentiment in the dental profession of Northern Illinois.

WHAT CHARGES SHOULD BE MADE FOR DENTAL SERVICES.*

By J. B. Dicus, D. D. S., Chicago.

The subject of fees as applied to dentistry is one which, to my mind, has been sadly neglected in the curriculum of dental colleges. The subject has been one which the professor of any chair would refrain from touching. The professor of operative dentistry would tell you how a cavity should be prepared, the filling inserted and polished, but did you hear him say anything about what *he* received for such fillings or what he thought the *average practitioner* should receive? No. The professor of prosthodontia would describe to you minutely the method of making an artificial denture beginning with the selection of the impression tray for the impression and continuing through the various stages, until the denture is completed; but again, I ask the question, did *he* make any suggestion as to what your charges should be for making this or that piece of work? No. Of each of the professors of the various chairs the same questions might be asked and I think, without fear of contradiction, the same answers would be returned as before.

Then to the point—the only idea of prices for dental operations which the dental student knows upon leaving college, is cement fillings and treatments free, amalgam fillings 50 cents, gold fillings, 75 cents per sheet for gold used, and, if work is a little slack, make it for 35 or 50 cents for thirty days. I say this is the only idea the young practitioner has of prices, unless he has been associated with a preceptor, or becomes associated with a student while in college who is familiar with prices which should be charged by dentists, and converses upon this subject. The average practitioner when he goes out to locate does not feel like visiting the practitioners of the town in which he is to practice. If he was to visit some of them he would meet with little information at their hands, though this is not always the case.

How much better would it be for every student who goes out from each institution of learning, if the various professors would have a heart to heart talk with the class, and be honest in telling what they receive for certain classes of work. These same students are likely to become competitors of the professors later on, and they should be so informed as to know what to reasonably expect and ask for work. If a young graduate cuts his fees very low in order to gain patronage and then raises them he is likely to offend his patients.

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*Read before the Northern Illinois Dental Society.

Every man must be able to fix the prices of his services to the patient, but by so doing he must have a standard to follow or gauge himself by. He must have a charge he would consider his minimum for certain kinds of work. For instance, if the practitioner believes and feels that the average amalgam filling he inserts should be worth one dollar or one dollar and fifty cents, and he inserts one which takes more than the ordinary time and energy to make it perfect, he should feel justified in charging an additional fee for it. I am talking now principally to the country dentist, but the same principle will apply to all, for in many cases the country dentist is better situated than one-half of the struggling city practitioners.

How often do we hear a dentist say, "Many times I have to put in amalgam fillings for 50 cents or 75 cents, although I usually get $1 or $1.50 for each one inserted, because some one across the street will do this, and I must do likewise in order to compete with him." I believe that if your standard by which you measure the worth of your amalgam fillings is $1 you should strive to maintain that standard with your patients.

We must all educate our patients to have dental work done and have it done right. When we stop to consider that only one out of every twenty individuals have dental work done we are brought face to face with the fact that the other 80 per cent have not received the attention in an educational way from our hands that they should have received, otherwise they would have been visiting us at stated intervals for an examination of the teeth. People are being educated in other lines, why not more so in dentistry? The farmer is taught now that he is not doing justice to himself if he uses a walking plow, that, in its stead he must use the riding plow whether it be by horse or steam power. The old way has been discarded for the new. The lack of teaching on the part of the dentist accounts in a measure for the small amount of dental work done in proportion to the number of people.

The farmer is taught the necessity of many of the modern implements, although the cost is greater. Could not the same thing be taught the people in dentistry, if only the time were given over to impressing upon them the great necessity for having these dental operations performed, and why it is essential that all their teeth be in the best condition for the proper mastication and subsequent assimilation of the food? If necessary, charge the patient for this advice or teaching, either adding this fee to the price of the filling or making a separate charge.

I do not propose to say what shall and what shall not be charged for any kind or piece of work performed. I have seen amalgam fillings for which a charge of $18 had been made, and they were cheap at that, as they had done service for twenty years and were still good for several more; on the other hand, I have seen fillings which were dear at any price.

We can none of us say a certain piece of work is worth a given amount. The conditions will vary in each case, but we can set a general price which will be followed as nearly as possible. I believe if a dentist is treating and removing the pulp of a tooth he is as much entitled to pay for this treating and subsequent root canal filling as he is for the filling itself and should make the charge and get it. I know of no operation in dentistry so tedious and nonproductive as the treatment of abscessed conditions. I firmly believe that we have ourselves to blame for not giving the patient to understand that this takes time and energy for which we must be rewarded. Many do receive a fair compensation for these services, but the great majority do not.

I believe there should be a free exchange of thought upon the subject of what should be charged for services. I am indeed mindful of the fact that the majority of the men who have no regard for prices and less regard for good work, do not attend any dental societies, consequently cannot be easily reached, but a little missionary work may reach them and ultimately do good. As I have previously stated, I do not propose to attempt to fix a schedule of prices which should be followed, as time will not permit in this paper, but I do hope to hear a free interchange of thought as to what many are doing and receiving.

One thought I wish to leave with you—what you do, do conscientiously and fearlessly, and make such charge as you in your own mind feel to be just.

CONTROLLING CHILDREN DURING DENTAL OPERATIONS.*

By Dr. C. W. Cox, Batavia, Ill.

Little children are little trees, or are like little trees. If you should see four or five acres of little trees of all varieties about three feet high it would be difficult for you to tell what kind of big trees these little trees would become unless you have an expert's knowledge of trees. They look much alike and act alike.

They are young and tender and everything affects them much the same. When the glad summer days come and they are clothed in pretty garments of green they sway and bend and nod gracefully in every breeze, and when the summer winds blow they dance and rustle and throw their limbs about in reckless abandon, apparently in frolic and glee, but when the cold rain and hail comes and the tempest blows through their little branches they writhe and twist and bend their heads to the ground in fear and terror.

It takes little to make them appear happy and glad; it takes little to make them appear sorry and sad.

The old trees stood by unmoved by the breezes which caused the little ones so much joy and glee, and the tempest affected them but little in comparison to the abject agony it gave the little ones.

So little children are affected by little things. Little joys, like the zephyr, make them merry and glad; greater joys, like the summer wind, make them dance and shout and throw their limbs about in an abandonment of happiness.

Little sorrows, like the cold rain, make them cry and fret and feel forlorn and dejected, while real sorrows, like the tempest, make them writhe in agony and scream in pain.

But though little trees look so much alike when very young, there is a great difference between them and they cannot be treated just the same with the best results for all.

Little trees resemble little boys and girls, big trees resemble big men and women.

Some of our little trees will grow up to be tall and stately pines, towering and graceful, dignified and superb, like the late lamented Roscoe Conklin.

Others will grow up to be hardy, rugged oaks, hurling back defiance to the wild hurricane with their knotty and hardened limbs, like our strenuous young president, Theodore Roosevelt.

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*Read before the Northern Illinois Dental Society, October, 1902.

It is hard to tell unless you are well versed in trees what they will grow up to be. So the person who has care of these little trees must know what he is about or he will find he has been treating a peach tree as if it were an oak, and has maimed it for life, for no matter how much these little trees may look alike and act alike, you can never make an oak out of a peach tree, nor a cherry tree out of a gooseberry bush. I often think the primary and second grade teachers in our public schools do not always understand the little trees they are trying to raise, putting them all in rows, with the plum tree next to the hickory, and peach tree next to the oak, and the tamarack next to the palm—watering them all alike from their fountains of knowledge and then wondering why they do not all grow alike. Wondering why some become pale and dull, while others thrive and grow strong.

All persons having the care and handling of children should understand them, should be able to classify them and know what kind of men and women they ought to become.

A large portion of the dentist's life is devoted to dental operations for children, and that portion of his life is one of pleasure or misery, just to the extent that he understands the subjects he is working for. If the dentist is one whom the children take to quickly and cordially, he has that much advantage over the dentist whom children do not like from the start. There is some intuition in children which causes them to become friends at once with some people, while others find it very difficult to get into their good graces at all. Whether it shows that one class of these people is any better than the other I do not know.

I am glad to say, however, that I like children, and that children like me. Outside the dental office I never have any trouble making friends with them. I seem to know just what to say and do to please them, and it never required any study on my part. This faculty may simply denote childishness in me, but in any event I am glad I possess it.

When a grown person endeavors to make friends with a child, to make the child like him, to make the child happy, while he is enacting the role of the dentist and the child is playing the part of the patient, is a different proposition from simply amusing children under ordinary circumstances. But it can be done, and in many cases the children will go away and look forward with pleasure to their next appointment with the dentist. And they will come back smiling and happy and not the least afraid to come alone.

They will enter the office with a pretty "good-morning, doctor," which is delightful to hear, and climb into the chair without a thought of fear. When you once get them into this state of mind you can work for them as easily as for grown people, and can perform thorough operations, and their bravery then will put to shame that of many older people. Treat them carefully, giving them sympathy for the slightest pain, and perform the simplest operations possible which will save the teeth. Let them go when they show signs of weariness.

Ah, but to get them into this happy frame of mind is where the dentist's test of skill comes in. This is where he must exhibit his knowledge of the little trees for whom he is working.

The dentist who only has one rule for controlling children during dental operations will have a sorry time of it, and in many cases when his work is done both patient and dentist are on the verge of collapse.

When the little patients first come to you they generally come accompanied by one of their parents, and this pleasant duty usually devolves upon the mother, and her appealing looks and quavering tones do as much to scare the bravery out of the youngster she leads by the hand as does the dentist and his surroundings.

I think the first duty of the dentist is to gently, but positively, insist that the mother remain out of the operating room. It is next to impossible to control a child in the dental chair while the mother is holding one of its hands and trying to encourage it in tones that would frighten it under the most pleasant circumstances. These mothers do not realize how the mother pity and fear shine from their eyes, nor how their words, intended to inspire courage, by their pathos only cause terror.

The dentist, after having quieted the mother and placed her in the background, can devote himself to the case in hand, and here comes the only part requiring real skill and judgment. The dentist must know instinctively or by years of practice just what kind of a little tree or vine or plant he has before him.

These little people have the strongest kind of individualities and the dentist's business is to know what to say first. If he tries to go to work without any verbal understanding with the little patient he will probably run against a bank of subdued sobs, which will rapidly develop into a stone wall of screams and yells, which will bring the omnipresent mother quickly from her retirement, and then it is all off for that day. You can make an appointment for some other day, but if the appointment is kept it will probably be with some other dentist, and you have lost a patient because you did not know how to control children during dental operations. And the loss of one little patient means a great deal. Dentists who have practiced in the same town for a good many years know how ridiculously short the time seems to be since they were performing operations on the temporary teeth of children who are now leading their own children into the same old office to have their little teeth kept right. If through lack of discretion you had lost the confidence of these fathers or mothers when they were little people, you would not be doing work for their little trees now, for little children never forget the dentist, and if they acquire a feeling of resentment toward him when young the after years seem only to intensify it and they never get over it.

The bitterest enemies I have are grown people for whom I did dental work in their childhood days before I had learned the importance of gaining the confidence of children.

They don't bring their children to my office now, and I cannot blame them, but nothing I can say or do now would take away the feeling of resentment they have for me, caused, no doubt, from some impetuous remark I made to them in my early practice. And they hate me still—their children look askance at me, and if I live long enough, their grand children will still revile me. . But I am happy to say I soon learned the error of my way, and it has been a great many years since I have spoken harshly to a child.

And as a consequence I have several hundred people in my town and surrounding districts who never had a dentist look into their mouths excepting myself.

When a young dentist locates in a town of Illinois he is there for life if he is reasonably successful.

And I believe one of the greatest foundation stones for successful practice to rest upon is knowing how to control children during dental operations.

You gain their confidence while they are young and you have their practice always; they will come and see you when told to do so and you can have the pleasure and satisfaction of seeing thirty-two permanent teeth in their mouths when they reach manhood's estate and can feel that your life has not been altogether in vain. You also have a practice which belongs to you and which no one can take from you, a capital stock whose dividends are sure. So I say, no matter how much time it takes nor how many appointments you make, be sure of your little patient's good will and confidence before undertaking any operation of importance.

It would be unbecoming in me to offer such a body of dentists as I see before me this evening any rule or set of rules for controlling a given case, and if I had any rules to give I feel sure that many of you gentlemen here have better ones. This paper is intended to bring out discussion. And although the paper itself is not worth discussing, I feel the subject is one that should appeal to all, and I expect on this occasion to learn a great deal about controlling children during dental operations.

MATRICES IN CONNECTION WITH CONTOUR FILLINGS.*

By Dr. R. I. Blakeman, Indianapolis.

This subject is one of almost daily consideration for the busy practitioner, so any suggestions that may appeal to even a few of us as being of merit will, I feel, justify me in introducing such a routine topic.

We are very prone to form habits in doing our work, and when time is limited, refrain from employing a device which would greatly aid us, because we are more familiar with our habitual method.

The desirable features of a matrix are security of position, rapidity in adjustment, capability of receiving the proper form and also admit of being satisfactorily removed. I will not attempt to discuss all the various forms of this device that are offered for sale. All that I have tried are so often deficient, that it seems more practical to make one to suit each individual case. Brophy's and Gilford's band matrices are adaptable to many cases, as are also Woodward's screw matrix, Ivory's and others, but these are manufactured articles and consequently familiar to all.

A matrix can be readily contrived by cutting a strip from very thin steel (and I lay stress on the steel being sufficiently thin), which strip must be wide enough to extend from the gingival margin, to and above the mouth of the cavity. This may be adjusted by means of a ligature, by punching a hole in each end, through which the waxed silk is passed and tied around the tooth, then continue to wrap the silk around tooth and matrix until it is near enough the top of matrix to secure solidity.

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*Read before the Indiana State Dental Association, 1902.

The application of a little varnish will then prevent the thread slipping. In most cases, however, it may be more quickly made by lapping the band around the tooth, indicating the extent of the lap by a mark, after which remove and soft solder. This may be done by fluxing with muriate of zinc. This matrix placed on the tooth and an orange wood V shaped wedge, dipped in varnish and adjusted, affords a very satisfactory wall to build against.

If the filling is to be amalgam or other plastic, the matrix may be tightly adjusted at the cervix and allowed to flare or contour at the top.

By mixing the first amalgam soft enough to be slightly plastic, the floor and margins of the cavity are covered with a material that may be well adapted and which presents a smooth surface, proceeding with a mixture that is drier (less mercury) and malleting the filling as it advances against the matrix as well as the tooth, you have an opportunity to contour the filling pretty nearly as desired, and when the cavity is full the filling should be hard with no excess of mercury on the surface. Now comes one of the most gratifying features of a steel matrix—its removal. Rub a bit of mercury over the solder and the band is instantly unsoldered. Remove the band from between the teeth, on the opposite side of the filling. This slightly relieves the pressure of the filling and band against the opposing tooth and as the steel is less susceptible to sharp dents than softer metals, the straight smooth surface slips out with but little danger of damaging the filling, and you have the opportunity to trim with sharp lancets, before the filling has thoroughly hardened.

If we are to insert a combination gold and amalgam filling at the same sitting, then indeed do we appreciate a good, secure matrix, for of all the things that try one's patience, as well as the quality of his religion, it is to have a matrix spring away from the margin, just as he begins to put the heavy pressure on, in condensing the gold on the amalgam. Of course the easy removal of the matrix is desirable in this class of fillings as well as those that are all amalgam. It is usually necessary to leave the complete polishing of this kind of filling until a subsequent sitting, otherwise the mercury in the semi-hardened amalgam is carried over the surface of the gold.

The matrix is adjusted in about the same manner as above described, whether we use tin, tin-gold or gold. In using the former two materials I do not feel that it is necessary to have the matrix so loose at the cervix, as to permit considerable excess to bulge out after the filling is completed, in order to obtain a good surface and margin by trimming and polishing down. It seems to me the better result is obtained when the matrix is fairly tight against the margin, the filling may then be condensed from the beginning, and the surface already hard when the matrix is removed.

This, to some extent, opens up the subject of packing, or the technique of inserting the filling. While the matrix forms a fourth wall for the cavity we do not insert the filling in the same manner that we would employ if the wall remained. For example, in filling a four-wall cavity, we could fill with tin or a soft gold on the wedge principle and finish up with our sharp-pointed, wedge-shaped pluggers and secure a hard, good-wearing surface. Break away a side and the filling will pull away in sheets or layers. Now to avoid this condition when we remove the matrix it is necessary that we condense the filling against it as we proceed in such a manner as to obtain a similar surface along the matrix, to that of the top finished surface of the four-walled filling first alluded to.

To do this it is necessary to use square-pointed instruments in condensing along this wall, as the spear or wedge point used for working noncohesive gold, leaves this surface so that it is more likely to scale or to have pieces come away. These pluggers are used to advantage a little further in toward the center of the filling.

A considerable portion of the top (varying, of course, in different cavities) must be filled with cohesive gold; and here I will refer to a recent paper by Dr. Perry, of New York City, in which he claims that it is necessary to use square-pointed pluggers in building cohesive gold, in order to obtain an evenly condensed filling, that will not pit. Oval, or rounded points, such as would be used with hand pressure in working De Trey's gold, will hardly produce a well condensed mass that will stand the strain of mastication without pitting.

ESTHETIC DENTISTRY.*

By Dr. Alex. Jameson, Indianapolis, Ind.

Under this broad heading there has doubtless been enough written and enough thought of to make us all artists if we read or digested one-half that has been published.

I do not want to deal broadly on this subject, but wish rather to touch specifically one or two points which I have never seen brought out before.

We are all well aware of the difficulty in producing a natural appearance in some cases of artificial dentures. We choose plain teeth because we can give them the twists and turns necessary to make them look like nature. Nature never grows trees of the same exact height, or that have the same inclination, or that stand in a row. In fact nature does not grow anything that is especially symmetrical. Nor does she grow any one thing that is a mechanical duplicate of any other thing.

Artificial teeth, however, especially the "ready to wear" kind, are mechanically and symmetrically perfect, so much more so than any set that God ever made, that there are those critical people who note the difference and become suspicious. It does not do to make artificial teeth suspiciously perfect, yet how many of us do!

But it is not the form or arrangement or size or occlusion of teeth which I wish to speak of, but the color. We all know that we must select our teeth with regard to the temperament of our patient, but we do not apparently know that all manufacturers make their sets of teeth from second molar to second molar the same shade or as near as their experts can select. This sameness of color is one of the improvements on nature that is as noticeable as the evenness or the symmetry or the small size. Yet how many are the dentures made where special attention is given to the twists and turns and gold fillings and all that without even breaking a set of teeth!

If some one should ask me for a rule by which they might paint a picture I would be at a loss to give it. Or I might give it and they would be at a loss to apply it. I can, however, give a few observations which may throw some light on this subject. I have seen very few perfect or approximately perfect sets of natural teeth. I have seen but few sets of natural teeth all of which were the same color. As a general rule my observations have led me to believe that the upper centrals and laterals are nearly or quite the same color, the upper cuspids are yellower, the remaining teeth a compromise between the two and possibly darker. The lower teeth are nearly or about the same color, which is rather a lighter shade than the upper cuspids. Color we know depends greatly on light, its direction, intensity, etc. It also depends on the translucency of the object under consideration. Two teeth may have exactly the same amount of coloring with the light from all directions, but they will differ markedly when placed in front of some dark object.

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*Read before the Indiana State Dental Association, 1902.

For this reason the incisors being thinner than the cuspids, may show blue, while the cuspid having more thickness and being less transparent, retains more of its individual color or is not so much effected by surrounding colors and lights. Porcelain teeth are not translucent in the same way or the same measure that natural ones are. When we try to make them take the place of natural ones, we do not take this into consideration with the result that they all look alike in color. To overcome this dissimilarity in the properties of the respective kind of teeth, we have to depend on the principle of imitation. We try to imitate the average conditions as we find them, not reproduce them. Until our tooth manufacturers take this matter up in a scientific manner, we will each have to do our own selecting, and while the way may be more tedious, still the result will be gratifying.

PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL SOCIETY OF EUROPE.

Discussion on Dr. W. Mitchell's paper on "Some Notes Upon the Dentition of the Elephant and Injuries Thereto."

Dr. Barrett:

I wonder why such a subject as this does not appeal to every dentist. The subject of comparative anatomy is one that should be investigated by every man who desires to call himself a scientific man. The mere investigation of the human teeth for the purpose of promoting our business is not pure science, but applied science. When one sets out to pursue a series of investigations such as those which have been presented here that is true science, and I must congratulate this association on the presentation of a paper on a scientific subject. In the consideration of the subject of comparative anatomy we are apt to start out with the theory that there is a difference in teeth, that they do not conform to law. Now all monodonts, all homodonts, conform to one special law, all heterodonts conform to another law, and that law is a specialization of a peculiar archetype dentition which I conceive to be forty-eight teeth, six incisors in each jaw, two cuspids, four premolars and eight molars. We are apt to think that these teeth are something entirely different. Will the illustrator give me on the screen the first illustration which was presented with this paper? (Fig. 1.) We are apt to think of that as something which departs from the type of the human tooth. All we have to do is to look at that tooth and consider it from a single standpoint, and the whole complication is reduced to a very simple problem. Imagine that you cut it off at a point made between its apex and the apex of the pulp; you will then come through the enamel and have a portion of the dentine showing the cementum. The cementum in the gramnivora and in those more complicated forms is not developed in the same way in which it is developed in the human teeth. Let us consider the teeth of the elephant. Here is the dentine and all this is cementum. I can think of nothing that more perfectly proves the doctrine of the evolution of the various forms of teeth of the diphiadonts than does that. There are a number of separate denticles in the *mastodon giganticus*. You have them as single denticles each having its own cusp. The law of development of teeth is that every cusp shall develop its own root because the original consolidation of the whole was by the cementing of a number of single conodant forms into one conglomerate whole by the cementum. When you look at it from that standpoint it becomes intensely interesting, and pursuing the study you will become so much engrossed that I do not know to what extent you might not go. The essayist spoke about the irregularities in that celebrated elephant Jumbo. I have a cast of it, and it is the most remarkable of all the irregularities in dentition which I ever saw, human or animal. I can only congratulate this society that it has presented before it such a complete illustration of the pathological changes that may go in the dentition of the higher mammalia. If this thing can take place in the elephant where they are exaggerated so that we may readily study them, consider what they may not be in that still higher mammal, man, and from the one we may deduce the law which governs the other.

Dr. W. Mitchell:

I do not know that I can amplify my paper very much. I thank Dr. Barrett for supplementing the remarks I made with reference to the specimens, and I thank him most sincerely for his endeavor to impress on our profession the necessity of considering the dentition of the lower animals from a physiological and pathological standpoint. There is not enough pressure brought to bear upon the majority of students in connection with this very important phase of dental study, but I am pleased to note that there is a growing interest in the United States in connection with it. When visiting different colleges last winter in America I tried to impress upon the students the necessity of each one constituting himself a committee of one to help his *alma mater* by sending at least one specimen a year, and thereby forming a museum at the different institutions containing everything having a bearing upon comparative dental anatomy. By that means there might be enough material secured in the United States to form the grandest collection anywhere.

Dr. Barrett:

I wish to express the obligations which American colleges rest under to American practitioners abroad. We have received more from American practitioners abroad for the enriching of our museums of natural philosophy than from those in America. The gentleman who read the paper has enriched his *alma mater* with a collection that long after he shall have passed away will continue the teachings which he is so industriously engaged in while he remains on earth. The school with which I am primarily connected is indebted to Dr. W. Mitchell for a collection of specimens that I hope will teach comparative anatomy years and years after my voice and his shall be hushed in death. Gentlemen, will you help this work and add to the respectability of your profession by presenting any specimens which you can get to the colleges that have museums for their proper care?

DISCUSSION OF DR. BROPHY'S LECTURE.

Dr. Bogue:

I cannot help expressing my admiration for Dr. Brophy and his ingenious operation. I, as a dental surgeon, feel that Dr. Brophy's operation is an immense progress in this part of surgical territory. It is quite evident that he has given us a radical operation where we have only had general operations before. I believe there had been only two deaths in 700 patients, and no deaths from operations performed in very early life. Dr. Brophy has shown that this radical operation, especially in children, is without danger, and the operation is not only radical, but I believe effective in its results.

DR. WEISER:

My excellent master, Professor Bilroth, performed this operation in very early age upon children two or three months old, and he had a great number of cases in the years 1884 and 1885.

DR. AGUILAR:

Up to what age would Dr. Brophy recommend that operation? Because the operation performed on infants depends on the cartilaginous state of the maxillary bones for the approximation and for the incisions he makes over the malar processes.

DR. BROPHY:

I would not operate on a child usually older than six months for the transfixing of the bones. If the child is more than six months old I think the other method is the better one to employ. Usually between the fourth and twelfth week I would regard as the most desirable time, although operations transfixing the bones as late as the sixth month may be safely practiced.

DR. BOGUE:

I suppose my German colleague, Dr. Weiser, has not understood the difference between the operation of the professor he refers to and Dr. Brophy's. It is not a question of the operation being done in the first days of life. Many surgeons perform operations in early life, but not in the same way as they are performed by Dr. Brophy, who is able to get the bones together.

DR. AGUILAR:

I should like Dr. Brophy also to tell us whether he has any special indication to give as to his knowledge of the child in the period of cicatrization as to whether the sucking of the child is interfered with?

DR. BROPHY:

The only way is to feed the child from the spoon. It is not possible to permit the mother to nurse the child or the child to make use of the bottle during the first weeks after this operation. The act of sucking draws the air through the parts, and this repeated might interfere with the process of union. Consequently I insist upon the use of the spoon, and a child having a cleft palate should be prepared specially for the operation by being taught to live on food given by the spoon. When we have succeeded in giving the child the kind of food that will nourish it, then we may operate.

Dr. George Cunningham:

We ought to be proud of this day. Dr. Brophy came over to England and I was somewhat ashamed of my country because there was a difficulty to find a place for him to give a practical demonstration of what he has shown you on the screen to-day. A place was found in Cambridge. Every surgeon is quite certain that all the world owes a debt of gratitude to Dr. Brophy for this operation, and Dr. Griffiths told me, "Well, Cunningham, to tell the truth, since the days of Fergusson it is the first really new discovery in that department of surgery."

Dr. Brophy:

I desire to correct one statement made by our friend Dr. Bogue. He said that many operations had been made without a death, and when this paper was read in Paris in 1900 it is true I stated that there had been no deaths from the operation, but I regret to tell you that on my return home the second case I operated on died about ten days after the operation. But I was told that the operation was not the cause of the death, but spinal meningitis, which might have developed had the operation not been made. Since that time I have lost two more cases, so that the mortality average has varied, but I consider the operation is one which can be performed with as much certainty in results as any other operation known in surgery. I would be neglecting what I consider a pleasure as well as a privilege if I were not to express my gratitude to the distinguished surgeon, Professor Berg, who has honored this association and myself with his presence here this afternoon, and who has so generously commended the work I have done. I would also like to say that I remember with gratitude the interest taken in our meetings in Cambridge by that noted scholar and educator, Sir Michael Foster; also by Dr. Sims Woodhead, by Sir James Crichton Brown, and last, but not least, the profound interest shown in our work by that noted surgeon, Professor Joseph Griffiths.

THE DENTAL REVIEW.

Devoted to the Advancement of Dental Science.

PUBLISHED MONTHLY.

EDITOR: C. N. JOHNSON, L. D. S., D. D. S.

WELCOME.

The present number of THE DENTAL REVIEW is issued on the precise date of the celebration of the fifteenth annual meeting of the Odontographic Society of Chicago, and we hereby take occasion to extend to all visitors a most cordial welcome. The profession of Chicago simply ask that those from the outside walk into the living room, the dining room and even into the kitchen and make themselves at home. There will be no locks on the doors of Chicago dentists during this meeting. We have nothing to do but to entertain—that is what we are here for. Our only solicitation is that some one may go away without asking us to do something for him. Unless we can do something for every one we shall not be comfortable. We have worked hard for this meeting, but the work will all be done by the morning of February 16. From that time on it will be play for us. The reason for that is that we shall have our friends with us, and all work is play when we are surrounded by our friends. At least that is the way Chicago feels.

To the lady visitors particularly we bid a gracious welcome. We are honored by their presence and we wish them to enjoy every moment of their stay in our city.

To ladies and gentlemen both, we have only to say that on this occasion Chicago is host, and all the world is guest.

THE DURABILITY OF GOLD FILLINGS.

Years ago some writer in the profession—it has seemed difficult to trace the statement to the original author—made the unfortunate remark that the average life of a gold filling did not exceed three years. In the face of the manifest impossibility of proving such a statement by any kind of statistics at our command, various writers ever since have quoted this assertion whenever they wished in any way to reflect upon gold as a filling material.

In the October, 1902, number of THE DENTAL REVIEW, two writers refer to the alleged temporary character of gold fillings, and this brings Dr. Ottolengui, the editor of *Items of Interest,* to his feet in a vigorous editorial protest in the January, 1903, number of his journal against such statements. We are quite inclined to join hands with the editor of *Items of Interest* in this matter. We have on previous occasions written as strongly as we knew how in opposition to the all-too-common heresy about gold as a filling material. If gold fails to save teeth, it is not because of inherent defects in the material itself. Gold should be given credit for what it deserves and for nothing more, but failures should not be charged to the material when the fault lies with the operator. It is undeniable that many gold fillings fail, but in every case an observant operator can point definitely to the cause of failure, and in most instances it will be found that it is something for which the gold itself is not responsible.

The simple fact is that the most permanent fillings made in teeth have been gold fillings. This fact is firmly established not only in the profession but in the minds of many of the laity, and it has not been established by hearsay but by extended experience. To show the impression that at least one patient has in regard to gold it may be instructive to quote her remark on the subject. The question had arisen as to the advisability of attempting to place gold in a certain remote cavity, which on account of its location and extent had led the operator to doubt his ability to make a satisfactory gold filling. When the patient was informed that in all probability the attempt to insert gold would result in failure, she looked up in surprise and said: "Why, I had always supposed that a tooth once filled with gold was permanently filled." And this impression had been gained by no other means than a very extended experience in having teeth filled from the time she was a girl. To her mind gold was permanent, anything other than gold was temporary. And it may be said in passing that the appearance of her teeth, many of them carrying beautiful gold fillings—some of which were thirty years old instead of three, and still in good condition—would seem to be a fair basis for her opinion.

Dr. Johnson was the lion of the evening, and was much sought after in the refreshment room.

After a very pleasant evening, the guests began to seek their respective domiciles about midnight.

The Second District Dental Society of New York, which meets in Brooklyn, held its annual meeting at the "Argyle," on Monday evening, January 12. Preceding the meeting was a dinner to the essayist of the evening (Dr. C. N. Johnson, of Chicago), at Brooklyn's most select club. This was a private affair, not participated in generally by the society.

The meeting of the evening was called quite promptly because it was anticipated that the papers and discussions would carry the meeting past midnight. It was much after eleven o'clock when adjournment was announced. A collation followed.

Two papers were provided for the edification of the society, one by Dr. Johnson, of Chicago, entitled, "The Treatment of Deciduous Molars," followed by "The Technique of Gold Fillings in Sixth Year Molars—Occlusal Cavities," by Dr. R. Ottolengui, of New York.

A few points brought out by Dr. Johnson was the impairment of the function of mastication in children by having sensitive teeth in the mouth, which teaches the little one to bolt food so as to avoid pain. In that way a habit is formed which persists often through life. Stress was laid upon the maintenance of these molars until they were ready to be replaced by the permanent teeth.

The treatment of pulpless teeth of children is little different from that of permanent teeth. If a fistula be present, eucalyptopercha is pumped through, then cavity filled.

Dr. Johnson affirms that root absorption does occur in these filled cases, though chronically abscessed teeth constantly bathed in pus do not absorb.

Immediately after Dr. Johnson's paper, Dr. Ottolengui was requested to present his, that both might be discussed at the same time.

Dr. Ottolengui emphasized this: *The filling in the occusal surface of molars should never be small fillings. Gold can be used in ninety-five per cent of all cases, and his gold fillings for children do not fail.* He fills teeth scientifically, and he says to study the sulci. As the doctor described his method, he was understood to say that the sulci were cut out very sparingly, but that the filling should overlap the edges of the cavity so as to protect enamel margins. This cannot be done with amalgam.

Dr. E. A. Bogue was first to open the discussion of both papers. In the few remarks made, he said: Preach to keep the teeth clean; that is the main problem.

Gold and tin is better than gold, or tin alone for children's teeth. Oxyphosphate and amalgam also play a good part.

Dr. Truman W. Brophy, of Chicago, quoted a few maxims which he said occurred to him as he listened—"As the twig is bent, so will the tree incline," etc., etc. His main theme was the importance of saving the teeth, and when we come to establish preventive dentistry that will be our greatest work.

Prof. Starr, of New York, agreed heartily with Dr. Johnson that the filling of interproximal cavities with gutta-percha assists interstitial growth of the jaws. As to pulp canal treatment for children, he has had much difficulty—generally leaves the old fashioned vent hole drilled to pulp chamber at gingival margin.

Touching on Dr. Ottolengui's paper, he said that he does not use gold generally in filling first permanent molars, but believes in temporizing. Dr. Starr made the somewhat startling statement that he leaves nature to enlarge some cavities, and believes it saves both the patient and operator much pain and labor. But the writer of this report affirms—what of the weakened dental organ, of the chances of inviting pulpless teeth, of the impression of slovenliness and carelessness it imbues in one's clientele? Dr. Starr does another great injury by such teachings, which certainly are not progressive or scientific or dignified.

He sets a horrible standard for the students he has under his care. Those were teachings of the old school, forty or fifty years ago, when dentistry was not practiced by professional men but by barbers or others who had only sense enough to open to the pulp chamber to give relief in conditions of impaired function.

It would be just as good practice to fill the coronal cavity of all pulpless teeth (with any material) and allow nature to establish the "vent." In these days a man's ability to practice dentistry is not limited to perfectly filling a cavity.

Dr. C. S. Stockton, of New Jersey, said some very nice things to Dr. Johnson; one was that his paper was nearly a classic on the treatment of children's teeth. Speaking to Dr. Ottolengui's paper, he said that few have the ability to put children to torture for one-half hour or more and then claim them as sweethearts. We generally can accomplish the same thing better with something else. Dr. McKellops, who always used gold, filled these teeth with oxyphosphate. But Dr. H. W. Gillett endorsed Dr. Ottolengui's practice in favorable cases—an endorsement with a sting to it. And he sustained Dr. Johnson by saying that arsenic should not be used in children's teeth, and went even further and intimated that it should not be used in any case. As to the filling of root canals for children, he used iodofrom and vaseline.

Dr. Chas. Meeker had only a few words to say, but wished to heartily endorse Dr. Johnson.

As to Dr. Ottolengui's paper, he (Dr. Meeker) may not always save teeth, but he saves much pain.

Dr. Brockway, of Brooklyn, believed the importance of saving the temporary teeth cannot be overestimated. He called attention in the practice of cauterizing surfaces of temporary teeth where the cavities were not too deep. He does not believe it desirable practice to use gold in teeth for children under fourteen years of age.

Dr. Wm. Jarvie, of Brooklyn, spoke of the deep cavities in temporary teeth in which he preferred to use amalgam, and said that there were a class of patients whose teeth can be filled with gold. Never use amalgam as a temporary filling.

Dr. E. A. Bogue came forward again to speak of cotton carbonized in a vacuum, moistened by an antiseptic and packed into pulp canals. This, he believes, was first brought out in Sweden.

Dr. M. L. Rhein, of New York, in discussing Dr. Johnson's paper, strongly advocated the use of oxyphosphate of copper, and is in favor of extraction at an earlier age than normal in cases of badly decayed deciduous molars. He agreed with Dr. Ottolengui in a large portion of his paper, but disagrees with a larger portion. Fillings of gold in children's teeth often produce shock of tooth, which is far better avoided.

Dr. Ottolengui took opportunity to discuss Dr. Johnson's paper, and he said that half of the trouble with children's teeth is that the dam is not applied.

His method of treating exposed pulps in deciduous teeth is to cap with eucalypto-percha, then a metal cap; over all, amalgam.

Dr. Johnson, in closing the discussion, dwelt upon the relative strength of gold and amalgam as brought out in the discussion of Dr. Ottolengui's paper, where reference was made to overlapping edges of enamel with filling material.

He said the stress becomes very great, and he would expect the edges to be broken down if amalgam was used that way.

Dr. Johnson commended the use of tin and gold, because it can be put in cases where he does not use the dam. Its chief virtue lies in the crystalline change which takes place.

Every man is in duty bound to use that material which in his judgment is best.

Dr. Johnson said he was more dissatisfied with his paper when he had finished writing it than any other he had ever prepared. The ovation he received at this meeting and the discussion elicited must have changed his impressions, for it certainly brought out some very able points.

It has long been the custom of the New Jersey State Dental Society to hold a midwinter meeting of its officers and prepare plans, etc., for its annual meeting, which is always on the third Wednesday of July and usually at Asbury Park, where it will be this year.

This meeting occurs at the office of the president, and in the evening he usually gives the officers and a few guests a little dinner.

Dr. Frank L. Hindle, of New Brunswick, is the president this year, and he evidently intended to outdo all predecessors, and succeeded admirably. Some forty--officers and guests—sat down to a most magnificent dinner at the Mansion House in that ancient New Jersey town on "the banks of the old Raritan," at about 7 o'clock. The menu was graced with the portraits of the nine principal officers. After the dinner had been attended to and the guests properly welcomed by President Hindle, speeches were made by Vice-President Sutphen on "Our State Society;" Dr. C. S. Stockton on "Reminiscences;" Dr. C. A. Meeker on "Our National Board of Examiners;" Dr. L. Ashley Faught, of Philadelphia, on "A Glimpse into the Future;" Dr. George Emery Adams on "Thoughts of the Hour;" Dr. W. E. Truex on "Wit and Wisdom;" Dr. R. M. Sanger on "The Ladies;" Dr. J. Allen Osmun on "New Jersey and Its Relation to Other States;" Dr. J. W. Fisher on "The C. D. A." and Dr. F. Edsall Riley on "Our Wives' Husbands." Music occurred at suitable intervals, and the

Rutgers College Glee Club rendered several selections. The plans under way for the annual meeting next summer show very plainly that the present administration intends to excel all others not merely in the size and quantity, but *especially* in the *quality* of that which shall be presented. Take due notice and govern yourselves accordingly; look (and come) to the East the third week in next July.

The Odontological Society never does things by halves. Its annual meeting, Tuesday, January 20, was a "red letter day" beyond the shadow of a doubt. Clinics of more than average worth were held all day, and the rooms of the Academy of Medicine where the meeting was held were crowded to overflowing. There were visitors from Boston, Chicago, Philadelphia, Baltimore and many towns between. Dr. George Evans was chairman of the clinic committee, and he has good reason to be proud of the result.

In the evening the large hall of the academy was filled to its utmost capacity to listen to Prof. Edward C. Kirk, of Philadelphia, on "The Structural Characteristics of Calcified Dental Tissues as Related to the Question of So-called 'Hard' and 'Soft' Teeth.' This very able paper was illustrated by means of the projecting microscope. The discussion, as would naturally be the case, was altogether one-sided, for Dr. Kirk's work was so excellent that there could be nothing but commendation.

Dr. Kirk said in part that the active causes of caries is a thing apart from caries.

"There is no basis for believing that some teeth or children's teeth cannot be filled with metallic fillings."

"Dr. Black's conclusions are not to be compared with the great body of clinical observers," etc.

Dr. Kirk quoted several times from the works of both Drs. Miller and Williams.

"Dr. Black's deductions, although valuable, fall short of the requirements."

After his rather short written prelude, Dr. Kirk proceeded to the use of the projecting microscope, giving a histological and chemical study of the teeth as seen ordinarily through the microscope and by polarized light.

Dr. Stellwagen, of Philadelphia, said in discussion: If we could read the teeth thoroughly, we would understand the animal.

Others who spoke to the subject were Drs. Andrews, of Cambridge, Darby, of Philadelphia, Brackett, of Newport, Faught, of Philadelphia, and Harlan, of Chicago. Dr. Perry, of New York, remarked that such efforts as Dr. Kirk's placed us to-day in advance of anything heretofore attempted, either in medicine or dentistry.

Dr. Ottolengui said he was "not a chemist, so could only sit and admire."

"It is a classic paper. We can always expect such from Dr. Kirk."

In closing the discussion, Dr. Kirk said that "it *means* something when we talk of hard and soft teeth. Surely we have had indications from all over the world, in all languages, that there is a difference."

Rather a sad finale to this most auspicious occasion of the year for this society was the passing of the hat for the collection of money for funeral expenses of a daughter of one of our most illustrious dentists of some ten and more years ago. More than enough was realized to defray these expenses, and also to keep her father's grave green for at least a year.

On the evening of the day after the Odontological meeting, a dinner was tendered to Dr. C. S. Stockton, of New Jersey, on the completion of forty-five years of active practice of dentistry in that State. One hundred and fifty sat around the board in one of the large rooms of the New York Athletic Club, corner of 6th Ave. and 59th St., facing Central Park. Dr. W. W. Walker, of New York, acted as "Head Master," on his right being Dr. Chas. S. Stockton, Rev. Dr. J. M. Buckley, Dr. E. T. Darby, Dr. R. Ottolengui, Dr. B. Holly Smith and others. On his left were Dr. S. G. Perry, Dr. J. Allen Osmun, Dr. R. M. Sanger, Dr. B. F. Luckey and others.

The speeches were very eulogistic, and the "last horn" did not blow until long after midnight.

It was an eminently successful affair, doing great honor to Dr. C. A. Meeker, of New Jersey, who conceived the idea and by dint of hard work successfully accomplished his desires. He was very materially aided in this by Dr. W. D. Tracy, of New York.

In his opening remarks, Dr. Walker paid homage to this great profession of ours and to Dr. Chas. S. Stockton, and expressed great regrets that one of our oldest friends, Dr. Norman W. Kingsley, could not be present. Last evening, as he was on his way home from the Odontological Society meeting, he was either thrown or fell as he was boarding a street car, and was hurt very seriously, having fallen on his back.

This news was a shock to all present.

Dr. Walker requested Dr. Stockton to say a few words for himself. The doctor said that if anybody in Jersey should receive honor like this, it should be Dr. Meeker.

Dr. Stockton is a very fluent speaker and for twenty minutes we were edified by his flow of thought and language. He told how he got into dentistry, and how he has striven to sustain ethics. That he was personally and intimately acquainted with all the principal dentists of his time: Weatherbee, Tucker, Abbot Clowes, the three Whites (Samuel S., and his two brothers), McQuillen, Garretson, Wildman, Thackston, Morgan, McKellops, Watts, Keating, Allport, Cushing, Taft and many others, and so he went on discoursing. A friend of his of forty-five years or more sat beside him, a clergyman, Rev. J. M. Buckley, D. D., of Morristown, N. J. He was called upon to speak. He said that for forty-one years Dr. Stockton has been caring for his teeth and in all that time he has not lost a tooth. He said many other pleasing things of his old friend, and the best way to succeed in life was to behave yourself and outlive your competitors.

Dr. E. T. Darby, of Philadelphia, during the course of his remarks, showed a book presented to him thirty-five years ago by Dr. Stockton. His was really a beatiful discourse. A letter from Dr. J. Foster Flagg was read. Other speakers of the evening, responded to toasts as follows: "My Neighbor," James B. Dill,Esq., East Orange, N. J.; "Nothing," Safford Goodwin Perry, D. D. S., New York; "The True Jerseyman," B. Holly Smith, M. D., D. D. S., Baltimore; "My Ideal," J. Allen Osmun, M. D. S., Newark, N. J.; "Our Dean," B. F. Luckey, D. D. S., Paterson, N. J.; "The Many Sided Man," R. Ottolengui, M. D. S., New York; "The Citizen," R. M. Sanger, D. D. S.. East Orange, N. J.

Yours truly, "THE BOROUGHS."

OBSOLETE METHODS.

EDITOR DENTAL REVIEW:

I was recently shown a printed examination paper of a State board in which an obsolete method of constructing an artificial denture was the only requirement in prosthetic work, and it was the construction of a full upper denture of single gum teeth, soldered work.

The time has long since passed when such a denture was advisable. From every point of view it is undesirable and uncalled for. In the first place, it is the most uncleanly denture, for there is, even with the utmost care, more or less space under the teeth which will be invaded by the secretions and which cannot be removed.

Then, it is utterly impossible to arrange single gum teeth, snugly fitted to the plate, and produce artistic effects in arrangement and restoring contour of the lip. A full denture on gold, with rubber attachments, is infinitely superior. Why take the time of the applicant in making such a specimen when it could be applied to much better purpose? For instance, a case like this is often required, a partial plate with teeth interspersed, or possibly the six anterior teeth of soldered work.

L. P. HASKELL.

REVIEWS AND ABSTRACTS.

THE FILLING OF TEETH WITH PORCELAIN. (Jenkin's System.) A text-book for dentists and students, with 116 illustrations. By WALTER WOLFGANG BRUCK, D. D. S., Instructor in the Dental Institute of the Royal University of Breslau. Translated from the German by CHARLES W. JENKINS, D. D. S., Zurich, Germany. Published by Consolidated Dental Mfg. Co., New York. Pages 68.

As the title implies, this is practically an exposition of the Jenkins method of porcelain restoration, though the individuality of the author enters into much of the technical procedure outlined. In a subject which is undergoing such rapid evolution of thought as is porcelain inlay work, it may well be expected that a book written, as was the original of this, in 1901, would contain many details of construction which more recent developments would practically displace, and yet the reader will find much of real value in this little volume. One thing particularly must be commended in the very highest degree. In considering the indications of porcelain inlay work the author is most conservative and logical. He is evidently not carried away by enthusiasm beyond the bounds of good judgment in its application as are too many of its advocates. If the same consistent tone as to its legitimate field had been assumed by all of those who have written upon it, the work to-day would have been upon a more certain basis of success than it is, and there would have been fewer failures to dishearten beginners.

The publishers have done their work well in the present volume, and the book presents a neat, clean appearance.

A POCKET TEXT-BOOK OF ANATOMY. By WM. H. ROCKWELL, JR., M. D., Assistant Demonstrator of Anatomy, College of Physicians, Columbia University, New York. In one 12mo. volume of 600 pages, with 70 illustrations. Lea's Series of Pocket Text-books. Edited by BERN B. GALLAUDET, M. D. Cloth, $2.25, net; limp leather, $2.75, net. Lea Brothers & Co., Philadelphia and New York.

This book is not intended to take the place of such extended works as Gray, but aims to give the essentials in a concise and convenient form. The subject matter is presented in an orderly arrangement, though after reading Gray, the descriptive work in some instances naturally gives one the impression of being hurried. In a pocket text-book on anatomy the author has a somewhat difficult task to present a vivid outline of so intricate a subject, but this book will be found very useful for those who have not the time nor opportunity to study the larger works.

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, The DENTAL REVIEW, 55 State St., Chicago, Ill.]

Cleaning Impression Trays.—To remove all wax from impression trays, boil in water into which has been placed a small amount of common washing soda.

J. R. WATT, Chicago.

◆

To Prevent Plaster from Adhering to Rubber in Vulcanizing.—Cover the model with tin foil about No. 20. This can be readily removed from the plate by soaking the surface before closing the flask. L. P. HASKELL, Chicago.

◆

Facilitating the Adherence of Cement.—Dry the surface to be covered with cement thoroughly in the usual way. Saturate a pellet of cotton with phosphoric acid and apply a thin coat, after which a small amount of cement mixed very thin should be placed all over the surface using the same cotton. Cement can now be mixed and applied in the usual way.

R. L. GRABER, Peoria, Ill.

◆

Partial Lower Plates.—Partial lower plates should extend well up on the lingual surfaces of the natural teeth, otherwise they would have to be very narrow, in most cases, to avoid contact with the muscle. A plate resting against the remaining teeth can be worn with much more comfort, being held in place better. More trouble arises from not extending the plates high than otherwise. This has been my experience at least.

L. P. HASKELL, Chicago.

◆

Amalgam and Cement in Combination as a Filling Material.—For posterior teeth with very large cavities, where good retention cannot be obtained, use equal parts of amalgam and cement, each mixed in the usual way, separately. The amalgam and cement can now be mixed with a glass rod and rolled into pellets. Burnish the pellets into the cavity, leaving room for a thin veneer of amalgam on the surface, which will adhere to the mixture of amalgam and cement. This makes a durable filling.

F. C. Aubrey, Chicago.

Replacing a Facing.—Grind the facing to fit the backing without removing the bridge or crown from the mouth. Drill holes in the backing to admit the pins, making them as nearly as possible opposite to, and of the same diameter as the pins. After the facing has been ground to fit accurately it can be cemented in place and the pins riveted with a plate punch. A piece of wood, properly shaped, should be used on the labial or buccal surface of the facing to protect it, and with the flat jaw of the punch placed against the wood the pins of the facing can be securely riveted with the pin point.

E. S. Wingren, Chicago.

Odors in the Dental Office.—The odor of medicines used in the operating room should not be allowed to permeate the office. It usually arises from the waste cotton saturated in the medicine and left lying on the floor or in a waste paper basket, and not from the bottles containing the medicine if they are kept securely corked. The odor may not be noticed by the dentist as he is constantly in the presence of it, but his patients immediately detect it as soon as they enter the office and its effect usually creates a fear of the operation about to be performed. A suitable receptacle should be kept at hand, into which the waste cotton can be placed immediately after using and the cotton can be destroyed before the next patient takes the chair. Where practical the window might be opened for a moment. The office should be well ventilated at all times.

Starting Gold in Small Cavities.—When a cavity is too small to use an assistant plugger, and the gold rolls and does not stay in place while starting the filling, it can be tightened into cavity in the following manner: The cavity should be filled one quarter full and the gold condensed, allowing it to roll if it will. Then take a clean, dull inverted cone bur that will fill the cavity as nearly as possible, and by using high speed and a little pressure the gold can be spread until it fills the bottom of the cavity perfectly and is firm in place. The idea being to spread the gold, and not cut it, a dull bur must be used. If the bur is clean there will be no trouble in making more gold cohere to what is already in the cavity. The method applies principally to small, round cavities usually found on the occlusal surfaces of upper molars, and lingual cavities in the anterior teeth.

CHAS. E. WOODBURY, Council Bluffs, Iowa.

* * *

Method of Taking a Bite for Full Upper and Lower Dentures.—Make base plates in the usual way, using pink or hard wax for the foundations, and softer wax for the ridges. Build the ridge on each base plate as near as possible to a height corresponding with the length of the teeth to be used, and fill out where it is necessary, to restore the contour of the face. Try in each base plate—the upper first—and note the effect as to contour and height of ridges and make necessary changes. Have the upper ridge extend below the upper lip as far as the cutting edges of the upper teeth should extend, and the lower ridge should be just visible when the mouth is open slightly. Have the patient close the jaws with the trial plates in position and be sure that the ridges meet evenly all around. Ascertain with an instrument inserted in the wax if the pressure is equally distributed throughout the bearing surfaces of the plates to the alveolar ridges. When assured of this and having indicated the median and lip lines on the wax, fix the two trial plates together with small staples and remove from the mouth.

G. H. MADILL, Chicago

* * *

Mummifying the Dental Pulp.—About three years ago I read an article on pulp mummification, and believing it the proper treatment for a devitalized pulp I determined to try it. I used a paste from the formula of Dr. Soderberg, first very cautiously, but after a short time in every case. During the last year I used it in eighty-four cases of which I have kept a record. Out of that number I have to report only one failure. I have had the opportunity in the last year to open into two of the teeth that I treated three years ago, and in both cases the canals were filled with a growth of secondary dentine. I refilled the teeth, and they have given no trouble since. I believe the failures have come from inserting the paste too soon after removing the coronal portion of the pulp and before the hemorrhage has been controlled. Care should also be taken to use clean instruments.

Method: The pulp is devitalized in the usual way, after which all the decay should be removed from the cavity. With a bur of suitable size, all of the coronal portion of the pulp and as far down in the canals as can be reached with the bur is cut out. Wash the cavity with warm sterilized water, and seal in a dressing of oil cassia. The cassia dressing is changed every twenty-four hours until the hemorrhage ceases. When this is accomplished, fill the pulp chamber with the paste, working it well down into the canals, and cover with cement. Pressure on the cement before it has set too hard will force the paste into the canals. The superfluous cement can be removed and the cavity filled with a permanent filling at the same sitting.

J. E. Christie, San Francisco, Cal.

MEMORANDA.

We are pleased to announce that Dr. Josephine D. Pfeifer, who was out of her office for some time on account of illness, is once more recovered and attending to practice as usual. Dr. Pfeifer is a most conspicuous example of a really successful lady practitioner. She is a constant attendant on dental societies, and has taken an active interest in professional matters generally ever since her graduation.

ODONTOGRAPHIC SOCIETY.

At the annual meeting of the Odontographic Society of Chicago the following officers were elected for 1903: President, F. B. Noyes; vice-president, J. P. Buckley; secretary, F. H. Zinn, 100 State Str.; treasurer, G. N. West. Board of directors: F. E. Roach, L. O. Green, H. A. Drake. Board of censors: D. M. Cattell, W. Girling, D. A. Hare.

THE ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA.

The Odontological Society of Western Pennsylvania will meet in Pittsburg, Pa., Tuesday and Wednesday, March 10 and 11, 1903, when it is expected to have the largest meeting of any in the history of the society. The executive committee are arranging with some of our best lecturers to be in attendance, as well as a great number of exhibitors, making it the most successful meeting ever enjoyed.

C. B. Bratt, *President.*

B. M. Loar, *Secretary.*

DENTAL MANUFACTURERS' EXHIBIT.

Last month was announced for the first time the Dental Manufacturers' Exhibit, Horticultural Hall, Philadelphia, March 17, 18, 19, 1903. The enterprise at that time was largely in the nature of an experiment. It has since had the enthusiastic support of hundreds of dentists. There is no possible doubt as to its success. This exhibit has been arranged by the makers of the goods to be shown. It is proposed to make manufacturers' clinics a feature of the enterprise. No dentist with his own interests at heart can afford to stay away one single day. Open from 9 A. M. until 10 P. M. Admission, of course, free.

OFFICERS OF THE INSTITUTE OF DENTAL PEDAGOGICS.

At the recent meeting of the Institute of Dental Pedagogics the following officers were elected for the ensuing year: President, J. D. Patterson, Kansas City; vice-president, H. B. Tileston, Louisville; secretary-treasurer, W. E. Willmott, Toronto. Executive committee: W. H. Whitslar, Cleveland; D. R. Stubblefield, Nashville; R. H. Nones, Philadelphia. Next place of meeting, Buffalo, N. Y., December 29, 30, 31, 1903.

Those having new teaching appliances which they wish to bring before the Institute will communicate with Dr. Wm. C. Foster, Baltimore, or Dr. L. S. Tenney, Chicago.

RECENT PATENTS OF INTEREST TO DENTISTS.

715,476. Elevating and controlling mechanism, James F. Hardy, assignor to Consolidated Dental Manufacturing Co., New York, N. Y.

715,263. Toothbrush, Albert Haussmann, Fond du Lac, Wis.

715,492. Mechanical dentistry, Henry A. Littig, Davenport, Iowa.

715,422. Artificial tooth, Moses I. Rubin, Philadelphia, Pa.

715,447. Dental plugger, John D. Wilkens, Chicago, Ill.

716,676. Dental cement injector, Henry L. Cruttenden, Northfield, Minn.

716,677. Collapsible dental cement injecting tube, Henry L. Cruttenden, Northfield, Minn.

716,759. Bottle for putting up tooth, toilet or other powders, Thomas D. Richardson, Philadelphia, Pa.

716,491. Composition of materials for dentists' or other uses, Stewart J. Spence, Harriman, Tenn.

716,781. Dental occlusor, Clarence L. Stocks, Greenville, Tex.

717,158. Artificial tooth and anchor, Samuel S. Bloom, Philadelphia, Pa.

717,094. Boxtooth crown and adjustable facing, Byron W. Haines, San Francisco, Cal.

717,402. Tooth powder receptacle, Thomas O. Holland, Philadelphia, Pa.

717,216. Tooth powder bottle, can or other container, Henry B. Kent, New Brunswick, N. J.

717,121. Adjustable wall bracket, Charles H. Richardson, assignor to S. S. White Dental Manufacturing Co., Philadelphia, Pa.

717,594. Dental broach, Wm. J. Miles, Jr., Middletown, Ohio.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, solicitor of patents, Fendall Bldg., Washington, D. C.

As I view the subject of preliminary training for dental students there are two dangers constantly confronting us, either that our students shall lack a sufficient mental development along purely educational lines to entitle them to respect as professional men, or that in the attempt to remedy this the purely mental education shall be carried along without the concomitant manual development to an age where this manual development is exceedingly difficult or well-nigh impossible of attainment. As a result of this dilemma we have to-day in our ranks men who are skillful manipulators of instruments, but who are so deficient in intellectual acumen as to be really a reflection on the profession, and we have other men who though well trained mentally lack the adequate manipulative ability to enable them to properly perform the many difficult and intricate mechanical operations necessary for the highest class of service to their patrons. As to which of these two classes it is the more desirable to have in the profession the present paper has nothing to do, but the fact, remaining as it does, points to a peculiar difficulty in the training of students for the future practice of dentistry. Much good can be accomplished in this direction by a judicious arrangement of the pupil's studies in the later years of his high school work, and this duty devolves for the most part on the members of the dental profession. It is usually the case that a boy begins to think something about the profession he wishes to follow when he is fifteen or sixteen years of age, and it is the natural thing for him to consult with members of that profession as soon as he decides that he wishes to take it up. If a boy thinks he wants to be a dentist he goes to the family dentist to talk it over, and it is just at this point that the members of the profession can do great good if they take an active interest in the matter and inform themselves as to the proper preliminary lines to suggest for a student to follow.

With the consensus of opinion among dental teachers as a basis to guide the practitioner in the advice he shall give under the circumstances, the work of the young man will be directed in such a manner that when the time comes for him to enter the dental college he will be so equipped that he can intelligently approach his special work with the least possible waste of energy or misdirected effort. It may not be out of place at this time to very briefly suggest a few of the things which should be emphasized in the preliminary training of such a student. He should first be impressed with the fact that above all things else the fundamentals of his education should be broad, that if he is to be a professional man in the truest sense he must have a cultivated mind. He should therefore study literature for its general culture, and if he does nothing else in this connection he should at least learn to use his native language without offense to its grammar or construction. A professional man who constantly sins against the simplest proprieties of ordinary speech is not well calculated to impress the public with the dignity of his calling. In line with the specialization which should begin in his preparatory work there are two subjects which stand out as distinct necessities—the study of physics, and a course in manual training. The laws of force, matter in motion, resistance to stress and kindred topics, all have a direct bearing on his future work, and as for manual training it is almost universally acknowledged to be the one essential equipment for the successful study of dentistry. It is true that some observers claim that this training may be given—as it is for the most part now—after the student has entered the dental college, but the danger lies in the fact that if deferred too long manual dexterity is exceedingly difficult of attainment. While it may be a fact that in some instances we see men beginning the study of dentistry at a comparatively mature age and yet making skillful operators it will invariably be found that such men were either previously engaged in pursuits which gave them manual training or else they were by nature mechanically inclined. There is one thing certain that no dental student either young or old ever gets too much development along manipulative lines, and it is quite generally conceded that the younger this development begins the more certain are the results attained. That this principle is clearly recognized by teachers in other fields is well illustrated by the remark of a prominent teacher of music recently to the mother of a boy of fourteen who was about to start the study of the piano. Said the teacher: "Your boy has lost at least seven years in finger development."

It is along these lines then that we should have our students trained so far as specialization is concerned before their entrance to a dental college, and it is confidently believed that if students were generally so directed they would come to us much better equipped than they do to-day.

Another important consideration connected with dental education relates to the order of studies that shall be taken up in the different years, but as this is a subject more suited to a teaching body than to a regular society it must be passed here with the simple statement that unless our preliminary training is revised in accordance with advanced ideas, a very radical change is needed in the arrangement of the college curriculum. As it is now the freshman year is crowded too full of abstruse and difficult subjects, to the utter confusion and disheartenment of many of our students. They are too suddenly plunged into the intricacies of such subjects as physiology, anatomy and chemistry, and are at this stage of their study utterly unable to trace any relationship between these subjects and their future life work. The grading of our college studies should be changed unless students come to us better equipped in mental training than most of them are. This subject is strongly commended to the careful consideration of such bodies as the National Association of Dental Faculties, and the Institute of Dental Pedagogics, with the hope that when the four year course is inaugurated a more equitable and utilitarian arrangement of the work will be brought about.

There is another reform needed in connection with the curriculum of our dental colleges, and which if we study the matter from the broadest point of view will be found to apply equally well to nearly all lines of professional education. It relates to the admission of all classes of applicants to the same grade irrespective of their previous work, provided, of course, that the minimum requirement for matriculation is presented. In other words a young man may go to Harvard, Yale, Princeton, Cornell or the Chicago University and graduate. During his university course he takes up the study of chemistry, for instance, and pursues this study for one or two years of his course. This young man enters a dental college and he is placed in precisely the same grade as a man who has not even the merest smattering of chemistry, and whose only recommendation is that he barely squeezed through his matriculation requirements. This is not right, and the temerity to say so is heightened by the fact that other professional schools err in the same way. It is a fundamental fact of equity and justice that a young man should be given credit for the knowledge he possesses irrespective of where he obtained it, and it is probably this one discrepancy in our requirements which has heretofore kept university graduates in many instances from entering dental colleges. There must of course be placed about a candidate for admission such restrictive measures that it will be impossible for him to assume advanced standing beyond his legitimate status, but when this status is once sufficiently proved he should be placed where he belongs, and not be obliged to go back to the beginning alongside of men who have as yet no status.

In line with this idea there should also be a reform in the grading of our students after they have entered college. It is a well known fact that there is the very greatest difference among students as to their native ability in the acquirement of knowledge and technical skill, that one student will readily grasp everything that is taught to him while another requires iteration and reiteration in a compound ratio in order to force anything into his intellect. It is not right to hold the bright student back on account of the limitations of the dull student by his side, and while this seems to be to a certain degree unavoidable in any kind of instruction where class work is followed, it should be the aim of dental colleges to remedy this as much as possible by making the element of qualification rather than that of time the basis of requirement for advanced standing or graduation. It would probably at this time be too radical a change to suggest that the time element be ignored, and to say that when the student has properly fitted himself for practice he should be given his diploma irrespective of the time spent in acquiring his knowledge. This would to some extent be a retrograde movement unless every college could be depended upon to discriminate carefully in its examinations and hold rigidly to the highest possible standard of attainment as a basis for graduation. But one thing the colleges can and should do even under the present system of a minimum three or four year course, and that is to hold frequent examinations for advanced standing throughout the course and grade their students rigidly according to this test. It is folly to admit a student to advanced standing year after year when his only title thereto is the barely eked out number of marks for a pass, probably given him as the benefit of a doubt on the part of his examiner, and this frequently with a downright condition on one or two subjects for him to make up. Such a student is handicapped through his entire course and is never capable of doing his best work. It is far better that he be placed back at the outset and made to do over again the work in which he is found deficient. If this were done the students would soon learn that it was a question of qualification rather than one of time, and would accordingly work with a more intelligent relationship to their responsibility in the matter.

And this brings up another subject which has been made the basis of much discussion in the past, and which has not by any means been settled yet. This relates to the advisability of culling out the undesirable timber among our students in the first year of college work or better yet, before college work begins. It would, of course, be a beneficent provision if it were possible to prevent a student whose natural endowments or lack of endowments were such that he could never succeed as a dentist, from wasting his time in the attempt to study the profession. But the question arises as to who is to judge of so intricate a problem as this? I must confess as a teacher of some experience and observation that I am not so sanguine of my ability in this particular as I formerly was. It seemed to me in the early years of my teaching that I could judge quite accurately of a student's ability to become a capable dentist by watching him in the first few months of his college course, but I am no longer so certain of it. I have had my judgment so frequently set at naught by these unpromising students, that I should hesitate long and guardedly before condemning one of them to banishment from our college walls.

The simple fact is that the requisites for the successful practice of dentistry, though quite numerous and very exacting, are yet for the most part of a nature which can be cultivated, and while this at first thought may not seem to be true, a careful analysis of the question if we had the time to consider it here would prove it to be the case. Granted, then, that this is a fact there is one single characteristic of a student which counts for more than anything else in his ultimate attainment, and that is the ability and inclination to plod. The sublime ingredient in a human make-up which impels the individual to constant application will do more to make a good dentist than any amount of native ability devoid of this characteristic. And so if I were called upon to judge a student as to his availability for the study of dentistry I should look to the question of his attitude toward his work—whether or not he was in earnest and really wanted to be a dentist, and whether he had unlimited patience and perseverance, rather than to the single question of his manifest mental and manual qualifications. This does not imply that there are not many men entering our ranks who would better be kept out, but merely that the selection of the proper timber and the rejection of the culls is not so simple a matter as many in the profession have considered it.

DOES THE DENTAL PROFESSION DESIRE A CHANGE IN OUR DENTAL LAW, AND WHAT CHANGES DO THEY WANT?*

By Dr. T. W. Pritchett, Whitehall, Ill.

This is an interrogatory more easily asked than answered. There has been an echo heard, at frequent intervals, that our dental law is a failure, that it does not fulfil the purpose for which it was intended, and that changes are needed to make it conform to the supposed requirements of to-day. This echo has been expressed in words to this effect, "that our dental law is one of the poorest—that not only are we behind other states in this, but we are behind the medical profession in our own state."

It may not be amiss to say, that many similar criticisms of the law may be founded on *beliefs* rather than upon *facts.* This conclusion seems warranted in the light of what *we* may *believe* the law to be to-day, against the *belief* of *some* who had active charge of the machinery of its execution some years ago. Facts are sometimes slow of ascertainment, as will appear from our experience with the dental law. It is the *"belief,"* probably, of many that our law is not sufficiently strong to protect the public against incompetent and irregular practitioners. This *belief* may be taken rather as a *fact,* for it cannot be denied that we have too many incompetents in our ranks to-day, notwithstanding our various *beliefs* as to whether the law and the administration of it be good or bad. Can it be *believed* that through the operation of the law alone as it is, or through the operation of any change that can be made thereto, every practitioner can be forced to a high degree of proficiency as a dentist? The reasons why we cannot are as numerous as the frailties and follies of men.

One high in authority as an educator of dentists, and of wide acquaintance with the profession has said, "that the *school* cannot *make* a dentist—it only gives him the opportunity to *become* a dentist." If the school cannot make a proficient dentist, what hope have we that the *law* can make one? It is not to be supposed that these words mean literally what they say, but mean rather, that if the student does not diligently make use of the opportunity given, while it is his main and only business, when and where will the opportunity come to him afterward? May it not mean that after the school has done all it can do, and the law has done all it can do, the real essence of success lies within the individual himself?

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*Read before the Odontographic Society of Chicago, Oct. 20, 1902.

Our dental act went into effect July 1, 1881, and we may note that this date marks the first *legal* recognition of dentistry as an *educated* profession in the State of Illinois. Before this time any and all persons were permitted to practice dentistry without conditions—*as a common right*—there being no restriction of law against it. This right was a legal status because none were prohibited from engaging in practice. After this date it became a *special privilege* for any person not excepted by the terms of the act, to engage in the practice of dentistry in this state, who held credential evidence of fitness by a diploma from some reputable school, or the ability to pass an equivalent examination by the Board of Examiners—all based on educational requirements legalized by the law.

Before we can say our law is a failure, we should take into consideration the circumstances and conditions existing at the time of its enactment—its purpose, and then ascertain whether we have gained or lost by its operation. It is said the aim of the law is to "raise the standard of education among the profession," and "to protect the general welfare of the people against the consequences of ignorance and incapacity, as well as of deception and fraud." "Nowhere does it contemplate a system of protection for individual practitioners arbitrarily, so that the 'ins' may profit at the expense of the 'outs'—that moment the *theory* of the law fails, public opinion sets against it, and its enforcement becomes impracticable as experience has abundantly shown."

The story of the passing of the act is graphically told in twelve lines by Dr. Charles Koch, in these words: "The statute received its initial impulse from the Illinois State Dental Society more than ten years prior to its enactment. Upon the urging of an educated laity, and a progressive profession, the solons of 1881 passed the act, which has been in force since July 1st of that year.

"The text of the law, as it stands, clearly indicates that from conception to birth, it passed through legislatorial tinkering and compromising. Its contradictory and inadequate provisions, its lack of a fundamental principle or concrete idea to enforce such a principle, are not the original conception of its parents. They are the results of unfriendly, captious and altogether injudicious meddling during the period of legislatorial incubation, that altered and amended it out of all semblance of its original harmoniousness."

Then follows an analysis of the law, pointing to its effect, defects and its required improvement. It may be said, however, that some of the defects referred to by Dr. Koch have been removed by the interpretation of the law by the courts, and the attorney-general, since the date of his writing. From the same writer we learn, "from the first annual report to the governor, made in 1882, there were but twenty students from Illinois in the various dental colleges for that year, while for a number of years previous the average was only four." There was not a dental school in the State of Illinois at that time, I believe. "From the 1888 report, it is learned that of the dentists in practice in this state in 1881, only one out of every eight held a diploma; of those who entered from 1881 to 1888, nine out of ten were graduates from reputable dental colleges, and the other one passed a satisfactory examination." In the first year of its existence, the Board adopted the following resolution: "Resolved, That after October 1, 1882, the Illinois State Board of Dental Examiners will recognize the diploma of no dental college except those that require their graduates to attend two full courses of winter lectures, or one full course after five years of reputable practice. The necessity for such a resolution reveals the existence at the time of a peculiar looseness in collegiate dental education. It requires no further comment."

One effect of the law was the springing up of "numberless dental colleges, some good, some bad, and some indifferent." So numerous for a time were dental faculties announced to the public, through catalogues and otherwise, that it was said by one to be impolite to address a Chicago man by any other appellation than "Professor." It is possible some of you will remember this remarkable quotation and the circumstance calling forth its utterance.

Notwithstanding all the adverse circumstances and conditions attending its enactment and administration, what have we gained by the law, directly and indirectly, and is its purpose being fulfilled? If we confine our observation to the declaration that "to insure the better education of the practitioners of dental surgery" was the main and only purpose of the law, we may safely say the gain has been enormous. For beginning without schools, there followed a deluge. Some died in infancy, some became moribund through the application of regulating stress, some are still waiting for the breath of life to be blown upon them, and some stand as beacon lights set upon a hill, shedding luster upon our profession, at home and abroad, the peer of any in existence—if not superior to them all. And as a sequence, we may infer that it was the *intention* that the schools should be the source and fountain of knowledge, from which the intended practitioner should present his credentials of fitness to entitle him to a place in the profession. Out of four hundred licenses that have been issued to practice dentistry in Illinois since August 8, 1901, all but three have been issued to graduates of recognized dental schools. From a course of two years of five months each, our schools for several years have given a course of three years of seven months each, and hereafter will extend their course to four years, with the minimum of seven months each year. In addition, the advanced schools of the country have better equipment, better facilities, abler faculties, teachers and demonstrators, have a larger patronage and, in a word, have made progress all along the line, with loss nowhere discoverable.

The preliminary educational requirements of students have been raised from a little above zero to some grade of the high school course, to be eligible for matriculation in our dental institutions; the better qualifying them for the more exacting technical studies incident to our professional schools—clearly all within the purpose of the law. The spirit of progress seems to have been rampant since the enactment of the law. Did the law create this spirit, or may it only have given it impetus? Have not the schools themselves been the advanced leaders to a higher state of professional skill and attainment in those who now receive credentials therefrom? And have not the examining boards kept pace *with,* rather than have *forced* progress upon the schools? Or is it more likely, the advanced schools having set the pace, have not been restrained by the boards and that the boards have only stimulated the slow-starting and laggard, to a quicker gait in the race?

Three important organized forces have been joined since our law was passed which have given great impetus to dental education—the National Association of Dental Faculties, the National Association of Dental Examiners, and the Institute of Dental Pedagogics, all animated with a common object in view—the better equipment of all who leave the portals of our schools, for the serious work of our profession. Through these and other agencies, perhaps, there has never been exhibited such a *wave* of progress by any profession since the enactment of a dental law by our own and the other states. Our law in this respect has not been a failure when judged by the results.

How about the administration of it? We have had some trouble —indeed much trouble. It was a new thing. There were apparent ambiguities that have required interpretation by the courts, and this has been going on from time to time until we now have a more definite knowledge of the meaning of the law. One feature, at least, seems definitely settled by decisions of court in reference to dental colleges, and the discretionary power of the Board to make rules and regulations governing them. Judge Chetlain, in his late decision, says: "The Board not only has the power to pass such rules and regulations, but that it is incumbent upon it so to do, and so far as possible to establish and promulgate them as the basis of the exercise of its discretion," with the limitation that they shall be "reasonable, general and applicable to all colleges alike." This court further says: "I have carefully considered the general rules and regulations in force at the time the relator applied for a license, and hold that, with the possible exception of that part of Rule 4 which requires certain evidence of a good English education, they are fair and reasonable." These apparently settled questions have given more trouble to the various boards than anything else connected with the administration of the law.

A comparison of the dental with the medical act shows no material difference, except in two things. The Board of Health has jurisdiction over the graduates of all medical colleges, and can compel an examination of all to ascertain fitness before issuing a license to practice. The enforcement of the latter, however, appears more "honored in the breach than in the observance." Our dental law does not grant these powers to our Board, except possibly the power of revocation of a license obtained through fraud. Several states have enacted dental laws, granting the power of examination, and require graduation from a dental college before the applicant can become eligible to the examination. Whether the extension of similar powers to our Board would be beneficial to our profession, as many think it would be, is a question that needs careful consideration before pressing for its enactment.

The power to accept or reject the work a school has confirmed (which school the Board had previously said was reputable and good), and to afterward require of the graduates of such school additional proof of fitness, seems to discredit the integrity of the school, and as well the judgment and verdict of the Board; and if applied to the present standard of the schools of our own state, such power would seem illogical and unnecessary.

The reason for such a provision must necessarily be founded in a distrust of the integrity of the boards of other states, or of the standards of proficiency required and upheld by them. And where such acts are rigidly enforced, they would seem to restrict the right of domicile, and the pursuit of happiness of citizens of different states whose rights were legal and honorable in the state from whence they came. With or without the power to examine or revoke, as the case may be, success in promoting proficiency in our profession alike depends on the efficiency of the schools, the boards, and all of the agencies engaged in advancing the educational work of the profession.

The means of enforcing the law against violators are not special. Prosecutions must be made under the general statutes providing for the class of crimes and violations committed. That we have very many practicing dentistry in our state without hindrance, who are not eligible to practice under the law, is patent to every one of observation. Not to any considerable extent illegally in the smaller cities and towns of the state, but in the City of Chicago it is believed to be an abuse of very considerable dimensions—amounting to hundreds. This condition should not longer continue without an effort to find out the reason for it, and remedy the evil, if possible. If there is a fault in the law, let it be pointed out. If there is fault in the administration of it, let it be pointed out. The penalty for violation seems sufficient to arrest the continuance of violation, if convictions were repeated continuously. One conviction may not suffice. Very many convictions have been secured and fines imposed, since the law has been in force. The main difficulty has been, still is, and most likely will be, to secure evidence against the violator and in getting him to the courts, or in other words, pushing the law against the violator. The whole profession is no doubt mainly responsible for laxness in this direction, for they are more interested directly in the enforcement of the law than any other class of our people, largely on the ground that it is necessary that personal sacrifice be made to secure the legal right to practice dentistry under the law, and that all should be compelled to make such sacrifice. While there are many difficulties involved in the prosecution of violators of the law, it is high time that a very determined and aggressive effort be made to reduce the evil to a minimum, especially in its most flagrant forms. It is "up" to you men of Chicago, to clean out this malodorous cancerous growth upon our body politic, for it is known to exist in your midst in its most virulent and indecent form. I have no doubt the Board will render "aid and comfort" to every proper effort to consummate this purpose.

It must be remembered that the financial resources of the Board are practically limited to fees received from licenses issued upon diplomas. The fees of any consequence, viz., those from examination being almost eliminated by the restrictions implied from the opinion of the attorney-general, all of which but little more than meet the necessary current expense of the Board meetings and per diem. This condition must necessarily trammel the Board in such a degree that it may become too conservative in efforts to execute the law, when it becomes cognizant of such violations of it as become its undeniable *duty* to prosecute. It takes money to prosecute, as well as defend, when an appeal is made to the courts and the law. Some of the states require annual registration of all practitioners within the state. The advantage of this is not apparent, unless it be in the more reliable certainty of income to support the Board.

The laws of some of our states provide for sponsorship by the dental societies (usually the state organization), in recommending to the appointive power, suitable persons to serve upon the State Board of Dental Examiners.

Exclusive of the differences I have mentioned, there seems left but few other features of our law in general which are not practically the same in all the enactments of the several states. If all the novelties in legislation have already been exhausted, in contemplating changes in our law, we may restrict ourselves to the well tried and proven methods obtained through the experience of our own and sister states.

If from this cursory survey of our law in reference to the circumstances of its enactment, the condition of the profession at the time, its condition now, the results directly or indirectly in consequence thereof, its efficiency now, and what may be expected of any changes that can be made for the future, there shall be formed a foundation for profitable discussion by this society, the purpose of the writer will be subserved.

PRESIDENT'S ADDRESS.*

By Alfred Owre, M. D., C. M., D. M. D., Minneapolis.

I wish to thank the association for the honor conferred upon me at the last election and I sincerely hope that none of its members will ever have an opportunity to regret it. I regard the reception of an office from this society as a placing of confidence and as one of the honorable events of a professional career and can assure you that I shall always associate the nineteenth annual session of the Minnesota State Dental Association with the most pleasant retrospect.

It must be a source of gratification for those who were present at the first inception now to realize that their fostering care has brought out and maintained this healthy and growing institution and I hope we have with us to-day a large majority of these worthy men, who have been such good predecessors. I make this reference because in considering the health and character of any society, the responsibility of its individual members becomes apparent in a high degree.

The association is by right of conquest the true and honorable guardian of the welfare of the dental profession in the State of Minnesota. This guardianship was promised under. and made a part of, the constitution, and I am happy indeed to be able to point to a glorious record, which amply proves this statement to be true.

As is the case in the history of all organizations of this kind, questionable actions have come to light, which for a time threatened the best interests of the profession and the association, but the old boys came to the front again and our banner still floats victorious.

The meetings have always been instructive and stimulating in character, consequently a great many have depended upon them for new light and advancement in dentistry. The community recognizes the association as the representative body and public respect has also been commensurate with our development. Hence it is seen that the association does a great deal for its members. Naturally we are here, first, because we primarily love our calling, and secondly, any motive or organization that will tend to advancement is always of interest. But does it not seem rather selfish to love the association, because it does or can do us so much of benefit? Would it not be more truly laudable to reverse the conditions and love the association all the more for the good we can do it? And there is a great deal yet to be done, as I do not think a single member is willing to admit that the apogee has been reached.

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*Read before the Minnesota State Dental Association, September, 1902.

During the year while meditating over the association's success in the past I was several times attracted to that lofty sphere, the laboratory of the future, and while there I fancied a grand and elaborate twenty-fifth anniversary, resplendent with original contributions, clinical features, reports, statistics, etc. In order to accomplish a celebration of this magnitude, we must begin now. Let each member volunteer mentally or otherwise, if he chooses, to make such an event a most interesting and glorious one.

But to come down to terra firma again, we see life before us, and life is always one of duty, in the association or out of it, if correctly lived. The dignity of the profession must at all times be upheld, and in this we ought to find a great deal of satisfaction and pleasure, because on our conduct depends in a large measure the public verdict.

The older members should see to it that all recent graduates are duly invited to join as early as possible, as there is no better place to study and form dental character. To be a member of this organization should be an incentive to work along special lines of investigation for the benefit of the profession. This ought to apply especially to the ambitious, who do not belong to themselves, but are, rightly speaking, the slaves of the world and I see no reason why the energies of such men should not be used, whenever possible, for the benefit of this association. Again, since this body occupies the position we all concede it does, am I not justified in asserting that it is every dentist's duty to affiliate with the association and thus contribute the annual fees, which are the only means of maintaining a work, which is to him a beneficiary in every sense of the word?

Now, my honored confrères, I have made an attempt to fulfill the unwritten part of the constitution, requiring the presiding officer to say something at the beginning of the session. This is such an established usage, that it might as well be incorporated in the amendments. For the remainder of the session, I ask your kind indulgence and assistance. I also at this time extend my personal thanks to the executive committee for their arduous labors, as well to those who otherwise have or will help to make this session a success, and lastly on behalf of the Minnesota State Dental Association, I extend to you all a cordial and hearty welcome and hope you will be benefited and feel inspired to greater efforts in this our beloved field of labor.

PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

A regular meeting was held Nov. 4, 1902, in the Schiller Building, with the president, Dr. Elgin MaWhinney, in the chair.

Dr. C. N. Johnson read a paper entitled "Dental Education."

DISCUSSION.

Dr. George U. Appel:

It has been a great pleasure to me to listen to this excellent paper. It shows careful thought and work and I wish we all could read it carefully and study it that we might be able to put our shoulders to the wheel and help in this grand work of dental education, and especially in the preliminary education required before entering a dental college.

A higher entrance examination is absolutely necessary; it will keep out men who are not qualified to take up a learned profession. A student's physical, intellectual and moral faculties should be well developed before entering a dental college—and still there are, even to-day, members of the profession who maintain that intellectual and physical training is unnecessary for a student of dentistry. I believe that men with such opinions are wrong; because dentistry is one of the learned professions, and if successfully and conscientiously followed, is one of the hardest and most taxing occupations that a man can select. Furthermore, a professional man is thrown in contact with all classes of people and the public expects of him more than merely an education in his chosen profession, and therefore a student needs a broad and general education before he gets his special or dental education.

Under general education, we understand the scientific and literary knowledge that a student should possess before entering a dental college. Possessing a broad general education, it will be easier for the student to enter the lecture room and take up such studies as anatomy, physiology and chemistry. He will then consider these studies as an upward continuation of his former preliminary work, and also the practical work in the chemical and histological laboratories and in the dissecting room will be comparatively easy.

In the early part of the paper the essayist points out that no student should be accepted in a dental college unless he is a graduate from a high school. Yes, I think he ought to have at least a high school education. I have had no experience in teaching in a dental college, but I have been brought in contact with dental students who had no education except their grammar school education and in many cases they were deficient in that. Some of these students were fearless, hard workers. In the beginning of their college course they expended their whole energies in trying to grasp such difficult subjects as anatomy, physiology and chemistry, but they soon became disheartened and found that they wasted energy, time and money in trying to learn a profession for which they had not a sufficient preliminary education. Here I think that some of our dental colleges do an injustice to such young men in accepting them.

In line with the specialization in the preparatory work Dr. Johnson points out distinct subjects—the studies of the laws of force. matter in motion, resistance to stress and kindred topics. All of these subjects are essential to the successful study of dentistry. Some observers claim that such studies and training should be included in the curriculum of a dental college, but as the essayist points out very correctly, the danger lies in the fact that if manual dexterity is deferred too long it will be exceeding difficult of attainment; and as our dental colleges have to accept men of all ages, from nineteen upward, it will be found difficult for a man of mature age to attain manual training, and therefore I would say that the special preparatory work should not be included in the curriculum of a professional college. In a dental college the student should be taught only the theoretical and practical parts of dentistry and of course the studies of anatomy, physiology, chemistry, pathology, materia medica, etc., etc., which are required for his medical knowledge; but as to the elementary study of physiology, chemistry, physics and similar topics, which I and many others would call kindergarten studies, they should not be included in the curriculum of any professional college.

There is another danger in including a preparatory course in the curriculum of a college, and that is, as we all know, a big percentage of our students come from very unethical surroundings, and dental colleges under the present laws, will not refuse to take such men even in their preparatory course, and as we all try to improve and elevate the profession, we certainly should try our best to prevent the acceptance of such men in a first-class college, because some of them certainly will be no credit to the profession.

I would like to say a few words in regard to another reform the essayist speaks of, and that is, if a young man graduates from a first-class university and takes up chemistry he should be given credit for this work in a dental college, and should not be placed on the same level with men who have not the slightest conception of chemistry, and the same justice should hold out to a student who shows great efficiency in his prosthetic and operative work. If a student can show his skill and ability in making twenty or twenty-five gold fillings to the full satisfaction of his professor this should be sufficient to excuse him from any further work of this kind. It is not the quantity of work which makes a successful operator, it is the quality, and it may give that student a chance to devote his time and energy to work in which he is not quite so efficient.

Gentlemen, I hope you will be stimulated by Dr. Johnson's admirable paper and help along in this grand work of dental education.

Dr. J. E. Nyman:

I do not know what Dr. Johnson said in his paper. However, from what I know of him, I can say that his logic is always sound, and his statement of facts is always accurate, and that he has had a very extensive experience in the training of dental students, and perhaps I cannot do anything more than to echo his words. I feel that it is essential, if we intend to go on elevating the plane of our profession, that the students who take it up will be of as high an intellectual grade as possible. I think, probably, they can be taught the practical side of dentistry and manual dexterity better in a dental college than can their minds be elevated to a higher intellectual plane. Furthermore, the course of dental instruction should be a nice combination of both the theoretical and practical. A man may know what to do, and yet may not know just how to do it, and that man is not fit to practice dentistry. A man may not know just what to do, but he may know how to do anything in the practice of dentistry, yet such a man is not fit to receive the degree of doctor of dental surgery. A man who is prepared to enter the dental profession is the one who knows what to do, why it should be done, and how to do it. Further than this, I do not think I have anything to say, except that should I go on with Dr. Johnson's paper, reading it to the end, I should not find anything to take exception to, but merely have to extend my endorsement to the whole of his paper.

Dr. E. J. Perry:

I am pleased to have the honor of discussing any paper written by my dear friend, Dr. Johnson. He writes convincingly, fluently, easily, but this time he has written on a *subject* which is really tiresome. Dental education? Why say dental education? Just say education. If we are to discuss dental education, where do we begin? Are we to begin with the young man before he goes to dental college, or are we to discuss the best way to educate him after he goes to his school, which is to instruct him professionally? Manifestly, we cannot discuss dental education proper, and not touch upon what the student must be before he receives his dental education. We cannot insist upon the higher dental education if the student has not the proper preliminary or general education. So, therefore, the discussion of dental education, of necessity, involves the discussion of education in general, and here we are led into a wide, wide field, and likely the most important subject before the world to-day. Through education lies the solution of all the great problems of the day. I state this as a general truth. But unless there is more love and sympathy in the hearts of men, even the higher education will do the world little good. I would emphasize this one thing, viz., the great importance of ethical study, the true meaning of professionalism, both from the desk and by the example of the teacher himself. The private and professional character of the professor himself is of more importance than all he can say to his classes, and should be a prime factor in his fitness for the place. Thus, the student may not only absorb the teachings, but the teacher. A collegiate education and four years in a dental college will not make a gentleman, unless he is "to the manor born," and carefully taught ethics, both by precept and example. I favor the old method of one or two years with a preceptor prior to entering a dental college. When a young man determines to be a dentist, he, as a rule, has small idea of what the natural qualifications are, or what an undertaking he is entering upon. After he has been six months with a competent preceptor, he will discover his unfitness, if he be unfit, and can abandon his course and seek other fields more congenial to his abilities. Much unfit material would be saved the colleges in this way. Again, the freshman who knows absolutely nothing about the procedures in a dental office is seriously handicapped and is himself a serious handicap to his demonstrators. I have seen scores of men enter the freshman classes who did not know the name of the teeth, did not know how to mix plaster, or any of the most simple mechanical procedures. Now, let a teacher try to speak on any dental subject, however elementary, these men do not know what he is talking about. Not only should he possess a preliminary education, but he should have a manual training by a preceptor; he should have read anatomy, physiology, chemistry, operative and prosthetic dentistry, and his natural fitness and preliminary education and preparation determined. Then he will likely be able to grasp broadly the teachings in our dental schools.

Again, it is an economic truth of tremendous moment, that the industrial combines or trusts and other economic conditions which really characterize our day have destroyed in a great measure the individual in the world of business. As a result, the young men are rushing in unnatural numbers to the professional schools. The increase is vastly disproportionate to the growth in population and wealth of the nation. Some way should be devised, aside from raising the standard of preliminary requirements or of dental education, to screen out at least the unfit material. Again, our schools may not have too many microscopes or appliances for theoretical study, but I say the practical branches, operative and prosthetic dentistry, especially the latter, are inadequately taught, and that the teaching of the theoretical branches is widely out of proportion to the practical.

The work of the International Dental Federation will likely result in the great betterment of dental education. The different schools of the world, by the comparison of the curricula of study, a unification of interests and methods, will no doubt be a powerful lever to lift higher the standards. And, now, if the National Association of Dental Examiners will only do their work by unifying the requirements and recognizing each other's licenses, this will be another step forward.

DR. L. S. TENNEY:

We are sometimes of the opinion that the subject of dental education has been thoroughly threshed out and exhausted, but now and then a man comes along with original ideas and gives us something new to think about. Dr. Johnson has taken a broad and comprehensive view of this subject, and I feel that one of the most commendable features of his paper is that he has not only pointed out what he regards as certain defects and deficiencies in our educational system, but he has gone further than this, and suggested a remedy. Whether all of the reforms he has advocated can ever be carried to a successful issue, or not, he himself may doubt. But one thing is certain, if we can accomplish any one of them we will have made a decided step forward. Another thing is certain, that no man or set of men can tell what the future course of dentistry will be. We can meet present requirements, but changing methods of practice will require changing methods of teaching, and as we cannot foretell just what the future practice of dentistry will be, so we cannot definitely state what the future teaching methods must be, all we can do is to devote our best energies to the work, and solve to the best of our ability each new problem as it arises.

I was glad to hear the essayist lay stress on the point that young men contemplating the study of dentistry should receive their training early, but I doubt if that is practical in a large majority of cases. He says that many men make up their minds early in life, at the age of fifteen or sixteen, to study dentistry or some other profession. It is no doubt true that such is occasionally the case, and I feel that when one really contemplates studying dentistry later on in life he should undertake an early systematic course of manual training. But if we make inquiries among students I think we shall find, for the most part, that very few have had any idea of embracing the profession of dentistry a year or six months before they enter upon its study. The technical training of the student therefore must be largely within the dental school.

Again, the essayist says that we should discourage students from advancing, as soon as we are satisfied that they will not become competent dentists. But, he tells us, we should not pass a hasty judgment, because in many instances the student who is backward in the early part of his course advances rapidly later on. Well, the mind is so constituted and our experiences differ so widely, that we cannot view all sides of a question alike. I do not fully agree with Dr. Johnson's views, nor do I wholly disagree with him. He has had a more extensive experience than I and I defer to his opinions. His experience has been with the seniors and juniors, while mine has been with the freshmen. But, reasoning from my own experience, I would say that the first six months of the student's work is a fairly good index of what the character of that man's work is going to be throughout the course. There are exceptions, it is true. Occasionally a student who is slow at first develops rapidly under training and discipline, and others who are proficient at the outset never seem to advance very much; but I feel, on the whole, Dr. Johnson, that at the end of three months with the freshmen class, I can point out to you almost to a man those who are going to make the best operators and the brightest men in the classroom.

As much as I was pleased with the whole paper, I was particularly pleased with that portion of it which dealt with the subject of preliminary requirements. That is the key to the whole situation. I feel it is by far the most important question that concerns the profession to-day. It is the main issue and one to which we should most carefully devote ourselves. A stream can rise no higher than its source, and what the practice of dentistry is to be ten or twenty years from now depends very largely upon the character of the men we admit to its study to-day. It has been truly remarked that the progress of the race depends upon the ability of each succeeding generation to take up the work where the immediately preceding one left it. Of our profession it is to be hoped that the future dentists will be competent to take up the work where we leave it, and I believe the outlook is promising. Each year students of a higher class are attracted to our dental schools, and that to me is the most promising sign of the times. Let us look to our preliminary standards. Dr. Johnson has advocated a high school graduation as the minimum requirement. I say also let that be the very lowest; but let it be still higher, if possible.

I congratulate the essayist on the presentation of his paper and on the masterly manner in which he has treated the whole subject.

Dr. G. V. Black:

I will not attempt to follow the essayist or the speakers who have followed him, closely, but I will say a few words expressive of my feelings on this subject rather than discuss the paper. There are a few essentials in this matter of preparatory studies, or the preliminaries of dental education, that I regard as of extreme importance, and unfortunately we are not able nowadays to judge of them accurately beforehand. Such an education as will serve as the basis for the development of the professional diathesis, if you will excuse me for applying such a term, is the most important feature. This is not a thing wholly within the schools. It is obtained more largely, perhaps, in the homes and in the social surroundings than in a school, although the schools will have much to do with it. In this education I should estimate culture in the English language as very important. I should say it was the most important factor. When I say the English language I mean it in its broadest sense. The man who has mastered the English language most perfectly and who has attained a wide vocabulary, so that he can read and understand what he reads, analyze his sentences and know the thought the author intended to convey, and who can follow a lecturer and understand what that lecturer means by the sentences which he pronounces, is the man who can succeed in dentistry and in the work of the dental schools. It is not so much a question as to how far he has gone in school; it is the mental grasp that he has acquired. At present we have to judge that by the counts he has made in school as our best guide, and certainly, as things now stand, a high school education should be the minimum requirement for entrance to a dental college.

Another very essential factor that was spoken of by the essayist is a man's knowledge of physical things. And right here let me say that I feel perhaps more to-day than ever before that the study of physics, as carried on in many of our schools, is almost useless. I do not regard the study of physics as being very useful to the dental student unless it is made a part of the laboratory course. Much of our laboratory work in the dental school, in the medical school, in the high school and in our colleges is so inaccurate that it becomes almost valueless. What we want to urge upon teachers is accuracy, and care as to accuracy, and careful mental culture accompanying this laboratory work. It is the only way to make a strong man.

As to this matter of judging what a student will do, it is the most deceiving thing I have ever struck in my life. I remember some years ago a young man who was pointed out by the teachers in the freshman classes as being extremely awkward in the technic departments; he did not answer well in any of the departments; he was slow and backward. I watched him. He surprised me one day by coming into my room and saying, "I would like to have a little talk with you as to the advisability of continuing my studies." I said, "What is the matter?" "Well," he said, "my work is very poor; I cannot do as well as the other students do; their work is generally superior to mine and so it is in the other laboratories." "Well," said I, "if you have developed the ability to see and understand that these students are doing better than you are doing, my advice to you is to go straight along with your work"; and he did, and he has become quite a successful operator, a careful, conscientious, plodding thinker. He became able to understand the differences of gradations in this laboratory work, and so the future of that man attracted my attention. He may have been slow, but he got there. There are some students of that kind; there are others who start out brilliantly, but do not succeed. They fail. Generally the failure is chargeable to the formation of some bad habit, not inability, and this emphasizes the importance of moral training in schools in primary culture. Work is the best safeguard against the formation of bad habits upon developing maturity. I sometimes feel that the age from eighteen to twenty-one or twenty-two is an exceedingly dangerous age to the young man. Think of it! How many men do we find going wrong at about that time of life? Not a few. This is important with reference to dental education, a matter that is difficult for us to control.

There is another feature I thought I would speak of, but perhaps I will pass it by. The matter of the curriculum in the dental school is one of extreme difficulty at present, and it is one that perhaps I should not undertake to discuss this evening further than to say I regard teaching in dental schools at present as in a state of chaos. It is not crystallized into form. The primary education of students, we may say, is crystallized into form. There is a general form that is recognized almost the world over, with certain variations. Our high schools generally have a range of choice of subjects. Sometimes there is but one required study in a particular year, but three or four may be made up by choice of the student or the parents, and yet there is a very well-recognized road to follow. This is not true in dental schools, as yet. While we have certain well-recognized subjects, there is no very well-recognized plan of presentation of these subjects in our dental schools. The larger number of our dental schools have been organized within the last twenty years—yes, I might say, almost within the last ten years. Some time ago I made a chart showing the time of organization, the number of students, etc., in every dental school in the country, and the line started from Baltimore and dropped rapidly, and then it ran away out a long ways, almost level, from ten to fifteen years ago, up to the present time. This array of schools has been organized so rapidly and suddenly that it may be likened to the condition of an army of soldiers suddenly brought together. Discipline at first seems almost impossible. It is so now with our dental schools; it is difficult to maintain discipline among our dental schools. For instance, I asked a student the other day who came from another school, How much time did you give to this particular study in the school from which you came? He said, "I have listened to lectures for two years in succession, the same lectures typewritten and read off." In some other schools he would have received a very different impression than that. So it is. We are in a chaotic condition, and it will require considerable time for this work of dental education to crystallize into form. We are experimenting with it, as it were, and as time goes on we will learn more and more by the intercourse we have with our fellows and by the results of our work as to the best methods of training dentists.

I do not think it is wise for the young man to put off his entrance into a dental school too late in life, and yet I do not think it is wise for him to rush into the dental school very early. We have a good many students come to us who have been engaged in teaching, or engaged in some business pursuit for a few years after their high school work has been completed, and, I take it, they are among our best material. Their training in business at that time of life is a very good thing for them. It is good for the young man to rub up against his fellows, to rub up against the world and learn something of what this world of ours is made of. A knowledge of humanity is an important and excellent thing for a student to bring into college with him, and it is an excellent thing for him to go from the school with. There are many things we are unable to do for our dental students that we would like to do. This kind of training helps them. We cannot teach dental students the business side of dentistry to any great degree. But, Mr. President, I am talking too long.

Dr. Don M. Gallie:

I think every one present to-night has been much benefited by the paper and the discussion on it so far. Dr. Johnson spoke, particularly, about the necessity of manual training, either in the preparatory training of the student, or after he has entered a dental college. A student from the city, who attends a dental college, in the great majority of cases, has usually received his preliminary education before matriculating, and it is not so difficult to teach him manual training as it is a student who comes from the country. Perhaps, it has not been possible for the student from the country to attend a high school or a school where he can get manual training, therefore such students are handicapped. Dr. Johnson mentioned a remedy which will fit such students for the proper reception of the studies they have to undertake in a dental college.

The curriculum at the present time is somewhat turned around. When a young man enters a dental college and begins his studies, among the first things he listens to are lectures on anatomy, physiology, histology, chemistry, bacteriology, things that he knows nothing about, and is not capable of grasping. What he needs is manual training, which will fit him to become a good dentist. With the four-year course, the first year's work of the student should be confined entirely to dental manual training. Give him all the metal he can use up; have him make all kinds of mechanical devices that are used in dentistry. In saying this, I do not believe it is necessary to teach young men to make instruments, because the average dentist is too busy to do that, and it is really cheaper to buy instruments than to make them. But the education received in that way will educate the fingers; it will test their mechanical ability. At any rate, during the first year students should receive more dental manual training, instead of so much anatomy, physiology, etc. There are a great many young men who have no general idea of mechanics; some of them are just out of high school or a literary college, and are not in shape to grasp the work that is necessary to make a good dentist.

Dr. Perry spoke of young men starting at the age of fifteen or sixteen if we are to have the class of men in the dental profession that we want to enter it. I do not see how it is possible for them to start in to study dentistry at the age of fifteen or sixteen. While this is a strenuous and progressive age, it is not possible for a young man to have sufficient education at that age to fit him to start in on any professional study.

Dr. Perry also spoke of the benefits accruing from a preceptor. It has been the experience of teachers in dental colleges that the young men who start in college without much training in dental offices, where they get the false notions and bad habits of their preceptors, usually turn out to be the best students.

Furthermore, he spoke of discouraging young men from entering dental colleges, saying that the country was crowded with dentists. One of the large pharmaceutical houses issued a pamphlet some time ago, giving the number of physicians, the number of dentists, and the number of pharmacists throughout the United States, and while there was one physician to every 1,800 people, there was only one dentist to every 5,600 people. The country needs a good many more dentists, and we have no reason to be alarmed that there are too many dentists.

I was somewhat interested in Dr. Perry's suggestion in regard to dental examiners. The Illinois State Board of Dental Examiners are trying to do their duty in regard to raising the standard of dental education. I am told the boards will examine the additional qualifications of all students entering professional colleges throughout the United States. This does not mean that the schools are not to be trusted, because we know that the better class of dental colleges can be trusted, and are doing their best to elevate the standard of the profession, and also raising the standard of preliminary requirements on the part of those who are admitted to dental colleges. The National Association of Dental Examiners will require preliminary educational qualifications of students, and they must have had at least two years in a high school, or be graduates of high schools, which should be the minimum requirement, and then, as Dr. Tenney has said, as time advances and the profession progresses, even that will not be a standard sufficiently high to make the dental profession that which we would like to have it.

Dr. L. P. Haskell:

Mr. President—I am very much obliged to you for being invited to speak on this subject. I certainly shall not undertake to discuss the paper of Dr. Johnson, because it is far beyond my ability to do so. It is an admirable paper from beginning to end.

There are two or three points I would like to call attention to in the matter of dental education, so far as my observation goes in my particular department, and those are two points that have been made by Dr. Perry. I think we should have them always in mind. First, the student should spend a year or so in the office of a good preceptor, and by so doing he is far better prepared to enter a dental college than the one who comes direct from the farm or shop, because he enters college then with a knowledge of the tools, the appliances, the names of various articles that are used. He has a good knowledge of the use of plaster, is able to make dies, etc. Of course, if such a young man enters the office of a dental preceptor, the preceptor ought not to expect of him his time for the purpose of doing errands, but he should work in the laboratory, obtain all the knowledge he possibly can there, and then, when he enters a dental college, he is far better prepared to make progress than otherwise. I have had occasion to notice this many times in my experience, having had quite a number of young men, who have spent six or eight months in my laboratory, then have entered college, and in every instance they have made remarkable progress, and have become experts in the line of prosthetic work.

Dr. J. E. Nyman:

There is one point that I intended to speak about, but forgot to do so in my previous remarks. Dr. Black spoke about it and I will reiterate it. I believe it is a distinct advantage, both for the dental instructor and dental student, if the dental student, subsequent to his graduation from a high school, shall have spent a year or two, or even more, in some commercial pursuit; or, if not a commercial pursuit, as suggested by Dr. Perry or Dr. Haskell, in the office of some good man as a preceptor. He then goes to college with a more mature mind. He views the work before him in the serious manner that he should. He does not waste his time, but goes straight from the hall of learning, such as a high school, to a little higher hall of learning, to a professional college. He eliminates frivolity, on account of this experience and his more matured mind. If he does not do this before he enters a dental college, he is liable to waste much of his time there, and this he can the least of all afford to waste.

Dr. Truman W. Brophy:

I think the paper read by Dr. Johnson will be productive of a great deal of good everywhere. It seems to me, it does not occur to most of us that a paper and a discussion like this, which we have heard this evening, are so far-reaching. This paper and the discussion will be published, and the views presented by the essayist and those who have participated in the discussion will be read whereever dentistry is practiced, and they will have an influence for good.

The question has been raised as to how to tell, when a student enters college, whether he will be a success or not. I do not think that is so difficult. Some men enter a dental college just barely passing the preliminary examination. But the way to determine whether a student will succeed or not, is to find out his characteristics, and the principal characteristic of that man must be energy, and a determination to excel. He must have a strong and irresistible desire to learn; he must not be careless about his work, and if you find a young man who enters college, who is energetic, ambitious to learn, who declares he will learn, you may be reasonably certain that he is going to be a success as a professional man. He who wishes to learn will learn, and after he learns he will know, and when he knows he will be a success as a professional man, provided he has the energy, the morality, and the determination to succeed. The man who fails to succeed is the one who is sent to school by parents who are able to defray his expenses and give him all the money he wants.

He is apt to be a failure. I do not wish to convey the impression that all such students fail to accomplish much in college; but there is a class of students in our own country, but more particularly abroad, who are always university students, so to speak. It may not be generally known, but courses are pursued in our dental institutions by making it absolutely necessary for a student to be faithful in his attendance upon his college work, and this is in striking contrast with the system in vogue abroad. The gentlemen who have been abroad know how the university courses are conducted. A student may enter a university and may not put in an appearance for a month or more, but when the time comes for his examinations, he must be able to pass; if he fails to pass he is continued year after year; they do not insist on his being there; he can be there if he wants to. That leads to the difficulties that exist abroad to a much greater extent than in this country. Many students attend college longer there than they do here, because here they must keep up their examinations for advanced standing; if they fail to keep up their work, they are sent home.

A resolution lies upon the table of the National Association of Dental Faculties which I wrote and presented myself, and which will come up for consideration next year, calling for a full high-school graduation to become operative at the beginning of the course of 1904 as a preliminary requirement for admission to our dental schools. I am satisfied that every dental college in the city of Chicago will vote in favor of that resolution when it comes up for consideration. Whether it will be passed or not, finally, I do not know. It has been a struggle to carry along advancement in that body up to the present state, but it will come. I believe that if a high school graduation were required now it would not operate against a very large percentage of the students that have matriculated in the city of Chicago this year. A large majority of them are graduates of high schools; the others must have had at least two years' work in high school or else go before the State Superintendent of Instruction for examination. If they fail to pass, they are barred.

There is one phase of this question that I want to speak of, namely, digital manipulation or manual training, which is absolutely necessary to the success of the dental practitioner. I believe that the course of instruction now pursued in the technical departments of our college work gives these men the manual training necessary to be skillful in handling fine instruments, and in making delicate operations. In the four years' course, which will be inaugurated next October, there will be more time devoted to this, and quite likely the college curriculum will be changed so as to include other work in manual training not now considered. The laws of mechanics will be taught and applied, so far as it is possible to apply them in teaching young men the manipulation of instruments and the handling of metals, and all that goes to make up the highest training in digital manipulation.

Like all other callings, we are developing; we are developing more rapidly in some respects than the older professions. We have the best organization, I think, in the United States as an educational body; notwithstanding the dissensions, difficulties and differences of opinion that have occurred in the National Association of Dental Faculties, that body has accomplished a great work. It found dental education with almost nothing in the way of requirements; it found institutions graduating men after one course of instruction, and in some of those institutions only four months were required. When the National Association of Dental Faculties was organized in 1884, it changed that very soon, so that two years were necessary, of five months each, and then later a month was added, two years of six months, and only five years ago, three years were required, of six months each, and two years ago, it was changed from six to seven months, and now it has been changed the past summer to four years of seven months each. It may be that a resolution will be offered at the coming meeting, making it five years, of seven months each, to take effect five years hence. It would not be too much time to prepare a dental student for practice. It would give men an opportunity to qualify themselves in the various manipulative departments of dentistry, so that they would not go out experimenters, but well equipped to do all that would be required of them. Still, when we look at the work that has been accomplished in the brief period of the existence of the National Association of Dental Faculties, in about eighteen years, and consider the schools of the country that have stood together and have urged others to do the best they could to raise the standards everywhere, we have reason to congratulate ourselves. Each school has helped the others, and I think they will continue to help one another, and to do all they can to elevate the standard of the profession.

Reference has been made to the International Dental Federation, and to the Commission of Education of that body. It is not very well known what the International Dental Federation has accomplished; but the profession is learning; it takes some time to become thoroughly acquainted with every feature of the work of that body. The work of that association is certain to shape the dental education of the world by suggestion and by influence, upon the different nations. It is true, misunderstandings and misconceptions of its missions have caused difficulties, but the policy and aim of the International Dental Federation will remove many of these obstacles, and its work in the future will be better and more clearly understood.

Dr. J. G. Reid:

There have been quite a number of good points brought out tonight on the subject of dental education. I have never been able to get away from this one thought; that a part of one's preliminary dental education lies just as much in a preliminary office education as it does in a high school education. I regard as one of the preliminary prerequisites considerable time spent in a dental office under a preceptor. When I first entered dental college, twenty-seven years ago, I entered with a class of thirty-five. Of that number, there were only two who had not had a preliminary office education of from one to three years, and my experience has been that a preliminary office education is a good one, providing, however, that you are in the hands of a proper preceptor. I make that qualification. Some young men do not happen to enter the offices of good preceptors, while the majority of them do. The majority of those men who entered the class at that time, after being under the proper tutelage of preceptors, did so with a view of what a professional man should be before he entered a dental college. They knew what the requirements of professional men were and should be; they knew something of the conduct of professional business from the moral and ethical standpoint. That preliminary education has a very important bearing upon what constitutes ethical men in the profession. How many men are there, who enter dental colleges to-day, who have any idea of what ethics mean? Very few of them. They do not know what the principles of a professional gentleman should be. I was very glad to hear the remarks of Dr. Haskell, a man who has had many years of experience in professional life, and his judgment is excellent on questions of this kind.

Dr. Edmund Noyes:

If I take another view of office preceptorship it need not be understood as mitigating from the force or the truth of everything which has been said upon that side. I had a good preceptor myself, and spent a year and a half in his office before attending dental college. But the conditions of dental education have greatly changed since that time. It would benefit a young man to extend the time of his professional education to four years instead of three, as would be done if he spend a year in a preceptor's office before going to a dental college; of course that would be beneficial. But I presume that the consideration of adding one year to the course of study is not in the minds of those men who have advocated that policy. A young man coming out of a preceptor's office will bring to the dental school some knowledge of tools, instruments, manipulation, especially in laboratory work, probably not much elsewhere. But it is a fact that the freshman student who goes into a dental college and is put at the beginning of the course into a laboratory for the teaching of prosthetic technics, and a laboratory for the teaching of operative technics, will acquire in half the time and far more accurately a knowledge of instruments, of laboratory manipulations and materials, the handling of plaster and everything of that kind, than he can do in a preceptor's office. Moreover, he will get his teaching systematically, in orderly course, with definiteness, accuracy and thoroughness, such as not one preceptor in a hundred ever gives to a student. And in advocating this student preceptorship before entering college it is necessary to accept the evil of it as well as the good, and it is the experience and observation of dental college teachers that three-fourths of the preceptors are not good practitioners, and the young men enter dental colleges with bad ideas of manipulation, of handling tools and instruments, and in a great many instances with bad ideas of practice, and instead of having ideas of a professional gentleman a great many of these same students come out of the offices of their preceptors with ideas of professional commercialism. I admit, if all preceptors were good, that would not be the case. But, gentlemen, there *is* a time for the office preceptorship, and it is very important. There is no place where a young man can learn how to manage patients, how to carry himself professionally, how to conduct the business part of a profession and how to build up a practice so well as he can in a good preceptor's office. But the time for him to go there is after he graduates, and then he is far more competent to pick out a good preceptor than when he was a green boy. If a man will choose a good preceptor and spend a year with him after he graduates, it will be worth ten times more to him in his future practice than a year before he went to college. If a man can add one year to his professional education, making it four instead of three, or five, as it will be by and by, that is the way to put in the extra time.

I have been very much pleased to observe that every man who has said anything to-night about this subject, whether connected with a dental school or not, has expressed the belief that a high school diploma should be the minimum requirement of entrance to dental schools. Of course, we all understand that there are a great many men who do not possess high school diplomas, yet who are equally fit candidates for professional life; they have acquired the mental power and acumen, and possibly actual culture, in some other way. But as a practical question of standard and of test the high school diploma is more convenient than any other, and it is not practicable yet for us to trust the officers of dental schools as to their judgment in regard to students to determine whether or not they have culture and training equivalent to that represented by a high school diploma. And so it is impossible to avoid shutting out a few who would be worthy and acceptable students in order to prevent the admission of a great many who would be unworthy and unacceptable as students.

I believe no one in this discussion objected to the present methods of dental education except on the technical side, asserting that technical teaching in operative and prosthetic dentistry is not what it ought to be. I think that technical teaching in the dental schools in this part of the country is the strongest thing in them. The dental schools which we know and are familiar with spend more money and have more men devoting their time to technical teaching in the technic laboratories, in the operative and prosthetic infirmaries, in the histological laboratories and other places where various forms of finger training are carried on, and much more room is occupied and more men are thus engaged, relatively, than in teaching any other branches of dentistry. Those who give lectures, act as quiz masters, etc., in such subjects as anatomy, physiology, pathology, materia medica, etc., and which are usually known as the theoretical studies, are not able, for want of opportunity and because of an insufficient number of competent instructors, to do as good teaching as is done in the technical and practical departments. There is a constant pressure brought to bear on the schools for the minimizing and slighting of the theoretical studies for the benefit of the technical ones. I think, gentlemen, the place just now to strengthen dental education is on the theoretical side; that it is important to add to our already excellent technical teaching such strenuousness and such insistence upon theoretical teaching as will make scholars and professional men out of students and not merely operators, crown and bridge makers and prosthetic workmen.

Dr. L. P. Haskell:

In connection with the remarks of Dr. Reid and Dr. Noyes I want to say a few words more, particularly with reference to a student entering a dental office for a year or so previous to entering college. There is another thing that to my mind is very important which would develop the point whether that young man is competent to make a dentist. To illustrate: Over forty years ago, when associated with Dr. Allport, a dentist came in from the country who wanted some instruction in laboratory work. I arranged to give him instruction for fifty dollars and he advanced twenty-five. After two weeks I was so absolutely assured that he would make an utter failure that I gave him back his twenty-five dollars and said, "You may as well take your money and quit, because you will never make a mechanical dentist." He had been studying some ancient work on dentistry at his boarding house and would spend his evenings talking dentistry with the other boarders. That was the style of the man.

With regard to technical instruction, I have long been of the opinion that too much time is taken up in the lecture room endeavoring to tell the student how to perform some mechanical operation, which he will not comprehend only as he sits at the bench under the care of a competent demonstrator.

Dr. L. S. Tenney:

I have had the floor once this evening, but desire to say a word or two more. One or two of the speakers have advocated a year or more in a preceptor's office previous to entrance upon the dental college course. I think, gentlemen, that is the greatest mistake one can make. It has been my experience, and I believe it is the experience of the average teacher, that when young men come to us from preceptors' offices it usually requires three or four or six months to disabuse their minds of the erroneous ideas they contain. I do not mean to reflect on the practitioner when I say this; but it is simply due to the fact that in the practitioner's office the student gets no regular, systematic course of training, and consequently when he enters college he is not in a receptive frame of mind to take up work in a systematic manner.

Another point: The average young man has very little idea how comprehensive the study of dentistry is. He gets the idea into his head that, having been in a preceptor's office a year or so, he has mastered the whole subject. We have students who presume to go so far as to criticise and oppose their teachers. The education of the student should begin inside of the dental college. I believe in preliminary training, but let it be in the way of education of the fingers only, and not along professional lines.

Dr. Fred B. Noyes:

In regard to the last topic under discussion, I am willing at the outset to grant every argument in favor of preceptorship which Dr. Reid and Dr. Haskell have urged, but I am satisfied a preceptorship as a preliminary requirement for dental education has largely passed, because the times have changed; all lines have developed. The preceptor has changed; the requirements of the student have changed; the present time demands the highest possible efficiency, and it is evident that the student can learn more under systematic teaching, more in a technic laboratory than in a practical laboratory. On the other hand, the position of the preceptor has changed; the practitioner of dentistry to-day is more proficient than he was twenty years ago. He has not the personal time to-day to devote to such students. He wants some one to help him, not some one for him to teach, and for that reason a student to-day does not receive in the office of a preceptor what those men have received in preceptors' offices who have spoken to-night. with but few exceptions. The student must be taught; he must have the greatest amount of training in the shortest possible time. The professional acquirements which the student obtains from his preceptor unfortunately we do not find in the majority of men who come from a dental office, so that the disadvantages are greater than the advantages in accepting that as a requirement. We cannot distinguish between preceptors, and consequently we must lose some of that advantage.

Dr. Johnson (closing the discussion):

There is just one point in the discussion I want to refer to briefly. The statement was made here that the best students we have to-day in our dental colleges are those who, having received their general education in the public or high schools, have spent a few years in some commercial pursuit or in teaching, and then gone to dental colleges. This is true, provided they have in their fingers native mechanical ability without the necessity for developing it. If they have not that natural ability, by the time they enter dental colleges it is too late to develop it. I have had exceptional advantages of studying this. I came from a country where the matriculation requirements were high; many of the students were teachers before they became dental students, and I may say that there is in no profession of any country men who are better trained mentally than the dentists practicing in Canada to-day. They are men who write excellent papers, and you never have to apologize for grammatical errors in their manuscripts. They have a good command of the English language. But many of those men, who are so well trained mentally, are the hardest men to teach how to fill teeth properly, simply because their manual training has been deferred till too late in life and the muscles are not easily guided into mechanical procedures. With some men who are by nature of a mechanical turn this plan is admirable, but for the average student the best results are obtained by developing the manual and mental faculties together, and this should be started early in life. I know of no more unfortunate spectacle than that of a highly educated dentist who is wholly unable to perform creditable operations for his patrons, due to lack of mechanical ability—unless perhaps it may be the dentist who has neither education nor ability. As I have already said, I believe the requisites of a good dentist are more exacting, wider in scope and greater in number than in that of any other calling, and the best system of educating dentists is therefore a matter of the very greatest importance connected with the future of the profession. We should study this subject most carefully.

THE ODONTOGRAPHIC SOCIETY OF CHICAGO.

Regular meeting of the Odontographic Society, Monday evening, September 15, 1902, the vice-president, Dr. F. B. Noyes, in the chair.

The program for the evening consisted in an "Impromptu Talk on Caries, With New Illustrations by Drs. G. V. Black and F. B. Noyes," which was discussed as follows:

Dr. Geo. W. Cook:

Dr. Black and Dr. Noyes have done excellent work in photographing these teeth and cavities. These pictures will help to illustrate a great many points of contention between persons who have misunderstood the teachings of Dr. Black in regard to extension for prevention. There are some illustrations in this set that have certainly shown me a great many points that I had not thought of myself, and one was the extended area of the discoloration of enamel, much farther than any one conceives who simply stands at the chair and fills teeth. They can imagine that it is not necessary to extend the cavity to areas of immunity because they have happened to see at times fillings that have stood for ten or fifteen years, when, as Dr. Black has just said, the tooth would not have decayed any more if there had been no filling in it. This illustrates, too, that the extension would have been necessary if decay had been in a progressive state, or at any time the person had taken on susceptibility even after decay had stopped for a period. I am exceedingly glad that Dr. Black has brought this out at this time, because there are so many, apparently, who have misunderstood his ideas, and if they had been studying the microscopic slides of twenty-five years ago, when Dr. Black started the study of this subject, they would have better understood his teachings and his ideas of extension for prevention.

Dr. C. E. Bentley:

I have nothing to say other than to return my thanks to Dr. Black and Dr. Noyes for this excellent exposition that they have given us to-night. The logic of the paper, as it appears to me, is that extension for prevention is a consummation devoutly to be wished for; that is to say that the area of decay as we suppose it is and the area of decay as it really is makes extension for prevention an absolute necessity. I have recently returned from Minnesota, which I consider to be the stronghold of extension for prevention. Some man or set of men have impressed their personality upon the Northwest, or especially in St. Paul and Minneapolis, to the extent that extension for prevention is a religion, almost, with them, and I had the extreme pleasure within the last week or ten days of looking upon the operations of the men of that region. I believe Dr. Cook, who was with me, will agree with me when I say that I have never seen such masterly efforts in the way of operative dentistry for the saving of teeth as I saw in the clinic at St. Paul and in the offices in Minneapolis. I believe it is safe to say that St. Paul and Minneapolis and the farther North have a class of operators that in my opinion it is hard to equal in this country, and all because they have religiously adhered to the principles of this idea. I am a better dentist for having gone to the Minnesota State convention and seen the operations there. I think that the ideas that were suggested by reason of the lantern slides thrown upon the screen this evening emphasize that betterment, and, as I said before, I think that the logic of this lecture is that extension for prevention is the proper thing in modern dentistry, and personally I want to thank Dr. Black and Dr. Noyes for their utterance this evening.

Dr. G. V. I. Brown:

I am very glad to have an opportunity to thank you all for this pleasant evening. I have enjoyed it very much. I believe that what we have seen to-night is only the beginning of that which it will develop into, something perhaps far beyond our appreciation at this time. I know very little of photography, but have been troubled a good deal in trying to use the X-ray, as doubtless a great many of you have. I have found that peculiar reflections made results so uncertain that they were very unreliable indeed. I have no doubt that the same condition prevails, to a large extent, in photographs of this character, and I have no doubt also that a great deal of the contention between our various microscopists with regard to their results as published have come in this manner. I want to say, however, with regard to extension for prevention that as I looked at those pictures this evening and wondered what the shadows might be that always and in each instance seemed to go toward the pulp, my mind occupied itself with speculation as to what the practical application of extension for prevention would mean, if this were rightly understood. It seemingly would mean in most of those cases the ultimate extirpation of each plup. I believe that years ago we were on the right track, although we gave the wrong reason for what we did. Perhaps you may remember the fad that we all followed more or less in filling certain kinds of teeth with cement for a considerable period, in the belief that it caused a hardening of the tooth substance around the cavity, and that we got better results with permanent filling afterward. That, of course, Dr. Black thoroughly exploded through experimental test long ago, at least from the original point of view, but I think that we did accomplish something by the temporary filling of those teeth that was beneficial, and I believe that when we understand what those shadows mean we will better comprehend why it was that, having filled teeth temporarily and then again opened and filled with a permanent filling, we did get better results than when immediate preparation and attempted sterilization were followed by gold or other metallic fillings designed to serve permanently.

Dr. F. B. Noyes:

I want to say just a word. I think that Dr. Brown did not mean exactly what he said in regard to extension for prevention. Extension for prevention never refers to cutting in dentine, but always to cutting on the surface; the extension of the surface of the filling, never the extension toward the pulp. It has no application to the amount of dentine; it has reference to the extent of the enamel surface which is removed. So that in that sense I think Dr. Brown would be misunderstood.

Dr. G. V. Black (closing discussion):

I have but a few words to say in closing, and that is that this is an unfinished set of pictures—I don't know whether I made that clear in the beginning—and the pictures were not presented for the following up of any particular idea, but simply presented for what they show.

A regular meeting was held at the Palmer House, Oct. 20, 1902, with the president, Dr. C. N. Johnson, in the chair.

Dr. T. W. Pritchett, president of the Illinois State Board of Dental Examiners, read a paper entitled "Does the Dental Profession Desire a Change in Our Dental Law, and What Changes Do They Want?"

DISCUSSION.

Dr. C. R. E. Koch:

I presume most of you are aware that I am not now a practitioner of dentistry, but notwithstanding that fact, perhaps because of that fact I am better able to speak to you from the point of view that I have always treated this question, and that is from the standpoint of the people. So far as the dental profession is concerned, there is neither reason nor rhyme why there should be any dental law at all. If it were for the purpose of protecting the dental profession the law would be unconstitutional, because it would be class legislation. The only reason a law can be enforced is that to the several states are relegated, by the Constitution of the United States, their own internal police regulations, and for that reason it is impossible to hope that you can ever have a general law in the United States governing the practice of dentistry. Realizing that years ago, the members of the Illinois State Board of Dental Examiners took the initiative to organize the National Association of Dental Examining Boards which met annually for the purpose of comparing notes and seeing what they could bring about in conference that should bear fruit in their homes. The association in the early years (and here I will differ a little from the paper) labored in the direction of supervising, directing, and guiding the colleges to a higher plane. There were colleges in those days—and colleges. There was nothing in the world to hinder anybody who had two or three dollars from joining with two or three others, to go down to Springfield, and get a charter and start a dental college. The parties did not need to know anything whatever about dentistry. It was simply and purely a business transaction. For that reason the National Board of Dental Examiners undertook to guide the conduct of the dental colleges. There was then in existence an association of dental faculties, representing the only reputable dental colleges of those days. The other colleges, of course, could not get into that association, and in order to hit others and bring them into proper educational line, it was necessary to make regulations for those in the association, and it is but just to say it, they readily coöperated and acquiesced.

The dental law of Illinois, bad as it is said to be, is primarily responsible for much of the progress made in the education of the profession, and all credit is due to the dental profession that it has so far advanced beyond what it was twenty years ago. But other laws are just in the same condition. The people of Chicago continually find fault with the Constitution of the State of Illinois. This is no reflection upon the Constitution; it was all right when it was adopted; but conditions have changed. I hope the time will soon come when the intelligent practitioners of dentistry will agree upon a law that shall primarily give the people better dental service than they have had before, and that secondarily shall elevate the dental profession on to a higher and higher plane of professional standing, and unanimously request its enactment.

If you asked me what would be my remedy, I would say, in the first place, that the expediency legislation of 1881 is no longer necessary. Every one who had vested rights then has had them protected, and everybody who comes in now will come in under the existing law. My opinion is that, in the first place, there should be demanded graduation from reputable, recognized dental colleges. Second, that every man should be examined by the people's own officers, a state board of dental examiners. Third, a reasonable fee should be demanded to guarantee faithful conduct and to make officers serve without personal sacrifice. Fourth, the law should be so changed that it can be enforced even in the city of Chicago. Now, I will digress a little.

Under this law, as it now stands, and if I am wrong I hope some one will correct me—I am speaking of the law of five or six years ago—if you have a case against an illegal practitioner, you go before a justice of the peace with evidence and possibly convict him. He takes an appeal to the criminal court. There it will hang up, and if you should be so successful finally as to bring about a conviction, you are liable to find a court that will dissolve the verdict of the jury by the ruling that the case was not begun right in the beginning. It should have been presented before the grand jury, and not before a justice of the peace, and so all your labor is lost.

A year ago I had the honor to act as foreman of the grand jury, and I learned a great deal about criminal and semi-criminal procedure. We have the very best state's attorney with a corps of able and industrious assistants and in spite of them a large number of cases could not be presented. So many in this community of over two million people indulge in criminal and semi-criminal acts of an aggravated form that the matter of violating the dental law would seem so insignificant an offense that it would have to be put aside for the consideration of greater offenders. The legally constituted law officers could not have charge or secure indictment by the grand jury prior to trial and conviction by reason of their burden of other work. When I was secretary of the State Board, I tried it; the state's attorney was a personal friend of mine, but yet it was impossible to bring about an indictment. If the fees were large enough, so that the Board can have some means, I have no doubt a good deal can be accomplished even under the present law. Let us suppose a case: If you have a fund to draw upon you can go to the state's attorney and say: "Here is Mr. Knownothing, who is practicing dentistry illegally. Will you appoint Mr. Knickerbocker a deputy state's attorney, and let him take up this case?" I simply use this as an illustration. You know that it would require money to go ahead with the prosecution of these cases, which requires capable and enthusiastic counsel.

The other way would be to make a fine of a certain amount, making the penalty progressive and collectable as a matter of debt, sued for in the name of the people by the Dental Board before any justice of the peace.

Now, I know that my first proposition will antagonize some of my warmest personal friends engaged in dental education. But I believe, if you will look at it from a broad standpoint, you will find that the requirement of examining graduates by the people's officers is not a reflection upon them at all, and that in practice it will prove an endorsement rather than a reflection. In the State of Illinois the practice of medicine, pharmacy and law is governed that way. Why should dentistry be an exception?

Here is another point: You make the members of the State Dental Board judges under the present law of the colleges; and bear in mind the State Board of Dental Examiners does not have to judge merely the colleges of Chicago or of Illinois, but they are to judge the colleges of the world. How can they do it? If they act with severity and with searching investigation on the colleges within the limits of Illinois, and do not do the same with those colleges within the limits of Iowa, Wisconsin or Missouri or Germany or France, what is the effect? So far as Illinois colleges are concerned, they are placed at a disadvantage. There should be equality of all colleges before the law, to place them so, they should only be known by their fruits, that is, the quality of their graduates, measured by skill and attainment. The man who comes to Illinois and brings his stock in trade, his knowledge of, and skill in dentistry to offer to her people, should bring something that will pass muster here, is approved and wanted, and if he has not the qualifications required by the State Board he should not be permitted to impose on our people. Pardon a homely illustration in this connection, but it will cover the point. Suppose my friend Dr. Brophy to be a stock raiser. If he should send a car load of cattle to the stock yards, though he be known as an estimable gentleman, and a skillful and honest breeder of cattle, it would not be sufficient to say this stock was raised under the supervision of Farmer Brophy. The cattle belong to him, the reputation of his ranch is beyond question; the government of the United States would answer, it is not a question of where these cattle are raised or who raised them, but under the interstate commerce act and treaties with foreign lands we have undertaken to certify that each particular head of cattle has the sanitary requirements to make it acceptable to the market. We want to have these cattle examined by our experts in order to know whether they are sound or not, and fit for food for the people. I think we ought to treat this question of dental law from the same standpoint. Measure the man, and if he wants to be measured and to pass the trial successfully he will take good care to put himself into shape to pass it, and go where he can get his preparation the best. I believe so doing would mean a great up-building of the colleges, and instead of the colleges relying as they did formerly on their general reputation, they would vie with each other in having the greatest reputation for students admitted to practice and the fewest rejections.

This law has been bad, and yet it has accomplished a great deal. I think you have reached the point now when you can make a radical change. Get together, work together to get the law, and then work together to execute it, and I do not believe that two years from now any one of you will tell me that there are more than five hundred illegal practitioners in the city of Chicago.

Dr. J. N. Crouse:

According to the ruling of the attorney general of this state, the prosecution of all illegal practitioners must be undertaken by the state's attorney, and I understand that he and his assistants have agreed to take up the matter. The next point is, where are we going to get the funds with which to do this work? It is unfair to ask the members of the Examining Board to do all the work and bear the expense. It is a very important matter, and I think the dentists of Chicago should coöperate in the raising of a fund to assist the Board in its work. There is certainly great need of reform.

The other proposition was well stated by Dr. Koch. I have always contended that it would be beneficial to all concerned to examine every man who wants to enter upon the practice of dentistry, whether graduate or not. The various boards of dental examiners could compare notes, and if it is discovered that any colleges are not keeping up to the standard, and that the graduates from those schools are failing in the examinations, those colleges should not be recognized. The boards and practitioners in the various states should strive to get a law which will be uniform in its requirements, and which will compel the examination of all applicants.

Dr. G. H. Damron, of Arcola, Illinois:

The president of our Board has voiced the sentiments of the Board. I would like to leave the matter with the dentists of the state to decide in regard to whether or not we shall have a change in our dental law.

Dr. Crouse touched on a very important point when he referred to the expense of carrying on the work of the Board in prosecuting illegal practitioners. You will be surprised when I tell you that we have not enough money in our treasury to pay for postage stamps to send out letters. I do not believe there is a member of the Board who has not spent fifty or more dollars for the protection of the dental profession. Gentlemen, do you want the matter to stand that way? You have a dental board for the purpose of prosecuting illegal dental practitioners, and we have to have the authority of the state's attorney before we can hire a lawyer. Where is the money coming from to hire a lawyer? Have you ever paused to think about this? If you want the law changed you must go at it in a definite manner. The way is for each man who practices dentistry to go to a member of the legislature or of the senate from the district in which he lives, and point out to him the fact that there is much illegal practice going on in the state and show him the evil effects of it. Make the member promise before he goes to Springfield that he will look into this matter, and I believe good will be accomplished. These men must be interviewed. Sending them letters or notices will not do.

Dr. J. G. Reid:

Dr. Koch has left the hall, but I shall have to answer what he stated in the early part of his address. The law has been changed, since he was secretary of the Board, in this one particular: At the time he was secretary, the law was so arranged that it became necessary for an illegal practitioner to be indicted by the grand jury. Subsequently, in 1899, when the law was amended, that clause was cut out of it, and it made it possible for us to go before any court of jurisdiction with these cases.

I have had some experience in the last two years with illegal practitioners, and when we had our attorney we were making things uncomfortable for about a year. We prosecuted within that year about fifty illegal practitioners in the city of Chicago. It became noised around after a while, that the members of the Board were doing this work because there was a profit in it. Now, it does not take very long to spread that kind of news all over the state. God knows, if there was any money in it, I would like to have had some of it. The prosecution of these fifty cases cost about seventeen hundred dollars. This work cannot be done for nothing. It takes money. A dentist will write to a member of the Board to this effect:

"I want you to prosecute such-an-such a man across the street, who is an illegal practitioner; I want him to get out of here; he is injuring my business; I have complied with the law, he has not. It is your business to do it. That is what you are a member of the Board for." I suppose the secretary or some member of the Board, has got to drop business, hustle around for a week or ten days, get evidence against the man, send a constable to arrest him, go over to the justice court and stay there for two or three days and fight the case. The secretary is usually the one who has to do it. He has to shoulder all of the burdens. I am not going to go out and hunt up evidence for the prosecution of illegal dental practitioners. I do not propose to waste my time in doing it. I have my practice to attend to. It is not right, it is not just, to expect the members of the Board to do this. I have perhaps fifty letters on my desk at present in which there are complaints made against certain illegal practitioners, and some of the dentists write me to the effect that "I must not mention their names, but they will say that there is a man on the corner of such-and-such a street practicing dentistry illegally. You are the fellow to go after him, but don't mention my name. I don't want to have anything to say about it." You should get some evidence against such men, and give it to the Board. It takes evidence to prosecute. You cannot convict a man simply on your say-so. If the profession will do something toward procuring evidence against these men, it will materially assist the Board.

We have been handicapped by the ruling of the attorney general for the last year. We have been badly handicapped by not having an attorney for the Board. This work must be done by the prosecuting attorneys of the various counties in the state. We have found out that some of the prosecuting attorneys have friends who are illegal practitioners, and in some instances they have absolutely declined to prosecute a man because he is a friend. We do not care anything about that, if we had the evidence that the man is guilty, and could furnish sufficient evidence to the attorney-general of this state. That matter could be easily remedied.

We have a fairly good law. I am in hearty accord with those who have spoken about the examination of everybody who comes into the state with a view to practicing dentistry. I believe that is the proper thing to do. That has been my opinion for years, and I see no reason to change it. Dr. Crouse has stated how we are able to judge where the poor material comes from. It is a handicap, as it is now, when the better colleges are striving for and making every effort to elevate the profession and have more thoroughly educated men, but there are too many weak colleges holding them down.

Dr. J. N. Crouse:

I would suggest that this society take the initiative in raising a fund to be put in the hands of the Board for the prosecution of illegal practitioners. Other societies in the state would then undoubtedly follow suit. I cannot agree with Dr. Reid that the dentists should secure the evidence, and if a fund were available I have a plan whereby evidence could be secured against law-breakers with less expense and much more satisfactorily than if everybody took a hand.

Dr. George B. Perry:

The work of the State Board of Dental Examiners is anything but a sinecure. Any one who is familiar with the efforts made by the members of this Board can appreciate to a degree the amount of work which is involved in the prosecution of these cases. If the Board received no other credit for anything it has done since its organization, each member deserves a crown for the work that has been accomplished in suppressing that nefarious college which has cast a blot on our escutcheon. I feel greatly indebted to the individual members of the Board for what they have accomplished. While I am not familiar with the details, I have known personal sacrifices on the part of some men on the Board in regard to carrying out their work, and they ought not to be called upon to use their own funds. The dental profession of the city of Chicago is strong enough, financially and professionally, to hold their heads high above the other conditions which are present about them. I feel sure that if a circular letter of appeal were sent out by this society to every one of its members, the Board would get returns which would be gratifying.

Dr. C. R. Rowley:

There is something more than illegal practitioners for the dentists of this city to look after. The Board has been in session three days and nearly two nights. During that time we have examined two candidates, both of whom were old and legal practitioners of other states. Do you suppose that we have to spend three days in examining these two men? No, Mr. President; our time has been largely taken up by so-called illegal and disreputable dental colleges. Telegrams have been sent away out west to Oregon, calling men here who are stockholders in these institutions, and they have appeared before the Board, consuming our time for nearly two days, arguing that we as a dental board should recognize those institutions. And what have we done? We have said to them, "No," and we will continue to say no until this Board is satisfied as to their qualifications to teach dentistry.

In regard to the dental law. I would very much like to see a law whereby a legal practitioner of ten or fifteen years' standing could pass from one state to another and practice without an examination. I would also like to see a dental law that would compel every man, be he a graduate of any college, to come before the Board for examination. I would like to see a law compelling the practitioner to devote *all* his time to dentistry and not a part of his time to music, telegraphy and Board of Trade matters, as many dentists are now doing.

I would like to see a change in the present interpretation of the law by the attorney-general. I believe it is wrong. The attorney-general says to us, that we cannot examine a man unless he has been a legal practitioner in another state for ten years; it makes no difference how long a man has been a practitioner in the State of Illinois, he cannot come before the Board. A man may have been practicing eight or nine years and be a good man, yet he cannot come before the Board for examination. That is wrong. A physician can come before the Board for an examination, and if he passes, can practice dentistry. What is a physician supposed to know about dentistry? Very little. And for that reason he should not come before the Board for examination.

I sincerely hope that this thing born here to-night will bear fruit, and that we will have funds with which to prosecute illegal practitioners and take care of the institutions that are trying to come forward and teach men dentistry without the proper qualifications and equipments for so doing.

Dr. Don M. Gallie:

I think the State of Illinois has about as good a dental law as any state in the Union. It is true, that certain sections of the law should be more clearly defined, so that we can act more intelligently. The law can be improved by inserting some clause by which the Board can be properly taken care of.

Our first act, when appointed, was to write to the attorney-general of this state and ask him for an opinion. While Dr. Rowley does not seem to agree with the attorney-general, yet it is the opinion of learned lawyers of this state and of the city of Chicago that Attorney-General Hamlin is the best attorney-general that the State of Illinois has had for many years. He may have erred in this case, but I doubt it. While the law may work hardship to a few, it will benefit the public.

In regard to physicians, any physician can come before the Board, take an examination and, if successful, can practice dentistry. If there is any class of men whose knowledge is extremely limited about the diseases of the mouth, and how to treat them, it is the physicians. I do not believe there is a physician in this city who could pass a satisfactory examination before any board of dental examiners. According to the law, any man who practiced in the state before the law went into effect in 1881, and has failed to register, cannot be granted a license, but he can appear before the State Board of Dental Examiners, take an examination, and, if he passes it successfully, may be granted a license. We have had one candidate of that class about six months ago. That class of practitioners is dying out.

In regard to the prosecution of illegal practitioners, we do not expect dentists to be detectives or sleuths, but what we do expect is that they will give us the names of men who are illegal practitioners, so that we may get after them.

We have heard a good deal about fake colleges. There are fake colleges all over. This is one of the things the State Board has to combat which is unpleasant. These institutions make great promises to prospective students, and one of the methods of discouraging them is by not allowing yourselves to be used as members of their faculties. There are fourteen state boards, and I do not believe there is any one board that has the hard time we have of obtaining money. I think the suggestion of Dr. Crouse is a good one, either that we get legislation in reference to the matter, or have an appropriation from the state for the purpose of prosecuting not only illegal practitioners of dentistry, but for prosecuting diploma mills. The sum of five dollars from each dentist in the city will cut but a small figure in his bank account as compared with the inroads these fake dentists are making upon his practice. This should be done. I have sufficient confidence in the dentists of Chicago that when the time comes to make an appeal for funds, they will respond.

Dr. Truman W. Brophy:

It is very gratifying to listen to such a paper and discussion as we have had this evening. About three years ago or less, at a meeting of the Illinois State Dental Society, convened at Rockford, this question of illegal practitioners and so-called disreputable colleges was brought up by myself, and I could not excite enough interest to get a discussion. There were no members of the profession in Illinois then who seemed to be particularly interested in the subject. But when Consul Worman came from Munich, Germany, and put in an appearance in Milwaukee, and made known to the people of the state a most disgraceful condition of things which existed here, and of which many had no knowledge, it excited interest, and since that time the subject has been foremost in dental circles, and the law of Illinois has been taken up, and an opinion has been given by the attorney-general, and we have now certain phases of it which make it better than ever.

I agree with Dr. Gallie that our law is not so bad as some would think, although it is defective in some respects. It will enable the Board to carry out the best interests of the dental profession, providing they have the means to do so.

If I were to make one comment on the remarks made by Dr. Koch, it would be to add one other provision to those already enumerated by him. He enumerated four or five clauses which he would like to have emphasized. I do not think I will hurt the feelings of any man in the United States when I say that I believe the boards should follow the faculties in examining all graduates. I believe, too, that we should have a better method of selecting our dental boards than that which is generally in operation now. Too frequently a man who becomes governor of a state, when appointing a dental board, wants to know what a man's politics are, who he voted for the last time, what church he belongs to, etc. What difference does it make to the dental profession and the people whether a man is a Democrat or Republican, a Baptist or a Methodist, a Catholic or a Jew? We want men who are capable of filling these positions on the Board. We want men who are qualified to take students and examine them according to the teachings of to-day, and not according to the teachings of years gone by. How may we procure a Board such as that all the time? We may have a Board that is strictly reliable and qualified in every sense, such as the one we have at present, but what assurance have we that the governor-to-be will look to the best interests of the dental profession and the people of the state instead of appointing some politician who is in no sense a qualified person, either by education, morality, manhood, citizenship or anything else, to be a member of such a Board? That strikes me as the keynote of the whole situation. I do not know whether boards of examiners in general, or the Association of National Boards have ever discussed this question or not. If they ever did, I never heard of it. It is the foremost question before the dental profession of the United States to-day, and we should see to it that men are appointed upon our boards who are qualified in every sense for the position. We recognize the fact that the colleges are capable of improving. The colleges and the boards have done much to bring about these improvements, but they have not done all. Did the State Board ever propose extended courses in physiological chemistry, in physical diagnosis, in bacteriology, or in microscopical morbid anatomy? Did the Board ever propose such courses? The colleges have adopted these courses not by suggestion of the boards, but because such courses are necessary to qualify the student for the highest ends in practice. The Boards are working more with a view to the practical training, all of which is essential. How should a man be licensed to practice dentistry who is not qualified to discriminate between a morbid condition which would contraindicate the use of an anesthetic, and a condition in which it would be indicated? That is a feature of dental examinations which the boards must take up, and which, if they examine graduates or nongraduates, they must insist upon.

I have been told that there are five hundred illegal practitioners of dentistry in this city. I am surprised. Why are they here? When Dr. Harlan was a member of the State Board of Dental Examiners there was scarcely an illegal practitioner in Chicago. Why, it is the simplest thing in the world to stop illegal practice in this city, and I am not afraid to guarantee that I could stop every illegal practitioner in this city inside of two months, and I would not require $7,500 to do it. I would do it this way: I would secure the services of a stenographer and dictate a letter to every illegal practitioner whose address I could get, and you can get most of them. That is what Dr. Harlan did, and they soon disappeared. He would write letters to these gentlemen who were practicing illegally to know why they should not appear before the Board. This is a much better way than to arrest a man right off, because you may make a grave mistake in so doing. Such mistakes have been made by that method of dealing with these practitioners. If a man had a bill to collect, he would give his debtor a chance to pay it first before suing him.

Dr. Harlan would start out in the morning and ride all around the city, and watch for signs. He carried with him a list of registered practitioners, and if he saw a sign with a man's name on it, and it was not on his list, he would investigate and notify that man. He used to do this on Sundays. Monday morning a courteous letter would be written to such men, to the effect that they were reported as not upon the register, or that their names did not appear among the legal or licensed practitioners of dentistry, and they would please call at the office of the secretary at such-and-such a time, and comply with the requirements of the law. These men generally would come in about the first or second day after the receipt of the letter to explain their position. If they did not come, another letter would be written, stating that a letter written on such-an-such a date had not been replied to, and unless they responded to this letter, they would be subject to arrest and fine. This usually had the effect of bringing them to the secretary's office. If they did not come, they were notified that they would be summoned in court to show why they should be engaged in practice.

Now, there is not much expense except postage stamps and a little effort in dictating the letters attached to this method of dealing with illegal practitioners. What has been done can be done.

Dr. Crouse:

How many practitioners were there in Chicago at that time?

*Dr. Brophy:

Probably four or five hundred.

Dr. Crouse:

There was not half that many.

Dr. Don M. Gallie:

The conditions are different to-day from what they were when Dr. Harlan was a member of the Board, and Dr. Brophy's scheme is not practicable. No member of the Board has time to cover Chicago in this way. If the dental profession will furnish funds to pay the secretary, an assistant to the secretary or a private secretary for the

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*(Since the above discussion I have inquired of the S. S. White Co. as to how many dentists there were in Chicago in 1884, and am informed that there were between five and six hundred.—T. W. B.)

secretary of the Board, then we will be able to find out where these illegal practitioners are located.

Members of our profession in good standing send to us from time to time the names of certain men who are practicing dentistry illegally, but we do not know where to look for them. It is important that they should give their street numbers and locations.

Dr. R. N. Lawrance, of Lincoln, Ill.:

My experience on the State Board cost me three hundred dollars. I agree with Dr. Brophy and others that the Legislature should give us a decent law and not emasculate, as they did, the financial part of it. When I was on the Board a good deal of our work consisted in interviewing members of the Legislature, some of whom were personal friends of mine. I remember one gentleman whom I knew very well. I urged him to take the bill out of the committee-room and have it put on the calendar. He looked at me and said: "It seems to me you gilt-edged fellows want to run things." He then put his hand in his vest pocket and said: "How much is there in it for me?" I turned from him in disgust.

In my opinion, the law has been interpreted somewhat differently from what it was in our day. If this law was strengthened upon the financial side, and the Board given plenty of money to prosecute offenders, it would be good enough for the present. Of course, by legislative enactment, you might be able to strengthen the financial side, but I do not think I would try to get a new law. You might get an amendment to it. I do not know how you manage to deal with illegal practitioners in Chicago, but I will tell you how we do it. A man came to our town who said he had a diploma from some school in Cleveland. He advertised that he extracted teeth, etc. We went to our prosecuting attorney and told him that this man was practicing illegally, but he said there was no money in prosecuting such a case for him. We demanded that he look after this case, and he said: "Get the evidence." We sent out two detectives, who secured two or three people that this man had done work for, and they were asked whether they would appear as witnesses. They said they would. It was demanded that he produce a license, but he said he had none. It cost him $85 to get out of town. If every dentist, who knows of an illegal practitioner in his block, would go to the Board and report the name, it would enable the Board to get after him. If he does not want to secure the witnesses necessary himself, let him or the Board employ some one to secure them just as we did in our town.

Dr. L. H. Lawson:

Dr. Brophy has made the suggestion that there were men here practicing for two or three years, who had graduated from good dental colleges recognized by the State Board, who did not know their duty, so far as complying with the law is concerned. It seems to me that therein lies a suggestion that the dental faculties might take advantage of, and that is, to teach a little dental jurisprudence in dental colleges. Furthermore, I believe there is a great deal of truth in the remark of Miles Standish, when he said: "Serve thyself if thou wouldst be well served." I do not think the dentist should shirk his duty and throw it upon the State Board.

Just this fall I had an experience in my own office. A young man, who was not plucked in any sense of the word, but was short on time, came into my office and stated the facts to me, saying that he intended to locate across the street from me. While I was sorry for him, I told him that I would not uphold him in practicing dentistry illegally. He suggested practicing under an assumed name. He told me the other day that he was going to practice near the college, but he will not do so if I find it out. He will not practice in Chicago, if I find it out, unless he has appeared before the State Board, which I am positive he has failed to do in the last day or two.

Dr. Truman W. Brophy:

I intended to say something about raising money for the Board. The condition of things that exists now is very different from that at the time when the law was passed. The people of Illinois, and of the West particularly, are astir in regard to the disgrace brought upon our state the last few years, and, through the instrumentality of Consul Worman, the whole subject was enlivened. It is true that legislatures are not much given to making appropriations for boards, yet I believe that if this subject could be presented to a committee having the matter in charge, the Legislature might in the future do something in the way of supporting the Illinois Board of Dental Examiners, which has done such splendid work to bring our State up to a higher plane before the world. Such a movement would be supported by the educational institutions of the State. Many of the best men in the Legislature, and the governor himself, knowing what we have before us, knowing that our state, local and national societies have all contributed liberally for the purpose of redeeming Illinois, would see to it that something was done, although it might not be very much.

As to the remarks made by Dr. Lawson about young men practicing around Chicago, and other places, not having a knowledge of dental jurisprudence, I do not think there is any dental college in the country that fails to teach students dental jurisprudence, and we all know many of these young men forget and neglect these things.

I remember one of our demonstrators was brought before the Board. He had been demonstrating for two or three years, having neglected to have his name registered. He was fined; he paid it. He ought to have attended to his business. I venture to say there are a lot of men in this city who have neglected to do that. I believe that if an appeal is made to the dental profession we can rely upon them every time to stand by the Board, to put their hands in their pockets and help the Board with what money they need to carry out the provisions of the law. The State of Illinois can be relied on in an emergency to help out in financial matters.

Dr. Pritchett (closing the discussion):

I am pleased that you have taken hold of what I consider the main points of my paper. Of course, I have taken a rather tentative position in the paper.

As to the matter whether it is desirable to have jurisdiction over all graduates by the Board, I must say that I have been more inclined to favor this idea since I have been listening to this discussion from the *fact* that, as has been stated here, our memories are of such a character that they need stimulating in order to keep up. For instance, those who hold diplomas, graduates, if they continue in practice for a while and should contemplate moving to another state, their memories become so impaired or defective that possibly they do not know whether they can pass an examination or not. And so I believe it is desirable, in the interests of the people, that compulsory examination of every man be made, to ascertain if he has not forgotten (if he ever possessed them) enough of the essential requirements, both theoretical and practical, to warrant a belief that his professional services will be beneficial rather than harmful to the public.

It is not to be expected that the dental practitioner of several years will pass a creditable technical examination in those branches pertaining particularly to the medical profession, much of which is forgotten before the student leaves his Alma Mater. But he should be able to demonstrate that he is the possessor of such knowledge and skill of dental art and science that his handiwork will do credit to his profession, and merit the confidence of his patients. For after all that has been said and done, it is the man who *can do,* and *does* things, that is the real man.

I do not think there is anything further that I can add except that I am grateful for the consideration my paper has received.

WHY THEY FAIL.

By Dr. L. P. Haskell, Chicago, Ill.

It is strange that after all these years of experience and experiment in the manufacture of porcelain teeth, that manufacturers have not realized that one serious defect in the shading is owing to not following nature in its methods.

In the natural teeth the great bulk of the tooth is dentine, and that is always yellow, extending nearly to the tip of the teeth. The blue or gray shade is in the enamel and its intensity depends upon its thickness, sometimes, one-eighth of an inch of the end being solid blue. But above this, and all through the substance beneath the enamel should be the *yellow* body, light or dark, according to the necessity of the case. Were this principle carried out a natural effect now so lacking in artificial teeth in a large proportion of cases would be the result.

Dr. Taggart in a recent discussion of the subject of porcelain inlays, showed that he realized this principle when he stated that he made the lower layer of the inlay yellow, and so achieved more satisfactory results.

DOMESTIC CORRESPONDENCE.

CHICAGO, Feb. 7, 1903.

TO THE EDITOR OF THE DENTAL REVIEW:

Dear Sir:—In the article by Dr. B. L. Thorpe on the late Dr. A. Westcott an inference is drawn to the possibility of his being the first to use plaster of Paris for taking impressions of the mouth. The final impression that is left on the mind of the reader is that Dr. W. H. Dwinelle really first used it for that purpose. In a conversation with the late W. A. Goddard, of Louisville, Ky., about 1875, he told me that his preceptor used it for taking impressions as early as 1823 in the city of New York. Dr. Goddard said that even if his preceptor was not the first to use plaster of Paris, he certainly used it in that year and also used metal dies to swage gold and silver plates upon.

Yours truly,

A. W. HARLAN.

NEW YORK LETTER.

REFLECTIONS OF THE CHICAGO MEETING BY AN EASTERNER.

NEW YORK, March 1, 1903.

No, I do not think it can be a dream. But that vague feeling possesses me as if just awakening from one. It must be a memory of something. Yes, I am quite sure of it now. Why, yes; here is the flashlight photo of a few of those present; tangible evidence enough, surely, that the great meeting of the Odontographic Society was a fact.

A dream! What put that into my head? It must be that my thoughts never would permit me to believe so many dentists could be congregated for one event. *Twenty-eight hundred dentists*, or *more*, at a midwinter meeting of a local society. Just think of it. The thought is stupendous. But the handling of such a multitude is prodigious.

And the hospitality and the clinics and essays and demonstrations and dinners, entertainments and lunches, and still hospitality to complete the program. Oh, what a time.

But, let me reflect: What did I glean from the vast feast? It was so bewildering, and thoughts crowd so fast, that one hardly knows where to begin. The clinics! They seemed to be the most popular features, for the immense floor space was crowded during the hours set aside for that purpose.

Porcelain is the issue of the hour in Chicago as elsewhere.

There were clinics and demonstrations galore, dealing with all phases of the subject, from the making of an electric furnace or oven, by Dr. Ellerbeck, of Salt Lake City, Utah (probably the most popular demonstration of the meeting). If every one who uses an electric furnace knew how simple it was to repair or make one, a few people might go out of business.

There Dr. Ellerbeck stood for hours, making furnaces while you wait. I have one.

The only requirement being that those desiring one built supply the platinum wire.

This may be a dream, yet I think it will materialize in fact, that Dr. Ellerbeck will find himself in great demand at clinics in the future.

In another room sat Dr. Alex. Jameson, of Indianapolis, Ind., showing how to make a pure gold investment for fusing low heat bodies. He used archite for the impression because it takes such sharp ones, makes impression compound counterdie and swages up metallic box from that.

His only furnace is a Bunsen burner.

The simplicity of porcelain inlay (low fuse) was exemplified in his demonstration.

Dr. Louque, of New Orleans, demonstrated how simple it was to pivot either a Davis crown or the old style pivot tooth by using a platinum tube having a root saddle soldered thereto, and attaching that to the crown by fusing either high or low heat body to unite both.

Dr. E. J. Barr, of Bowling Green, Ky., showed a good method of easily making a gold crown with perfect occlusion and fit.

The Capon brothers are experts, and one learns a lot by listening and watching their clinics; and the same is true of Dr. L. E. Custer, of Dayton, Ohio.

And then the men who cliniced on restoration of tooth contour by means of gold!

There was Dr. Frank Holland, of Atlanta, Ga., and Frank Hettrick, of Ottawa, Kansas, and Dr. Cormany and a multitude of others doing everything dental.

The essays were excellent.

Dr. Kirk's paper did not appeal to all, but what subject ever did? He certainly has made much progress in the study of the saliva in the past year, since his initial presentation of the subject in the East. He had a full house. His microscopic slides were beautiful.

Dr. Ottolengui, of New York, read a paper on the "Rational Use of Porcelain in Filling Teeth," which elicited more rapid fire discussion and good natured bantering than any subject of the meeting. Dr. Ottolengui has a breezy way which takes exceptionally well.

And so I might wander on this way for an hour and then the story of the wonderful accomplishment of the promoters of this event would be but partly told.

But I must not forget that I dined there one night. Again it can be said that the gathering of dentists who sat together that evening (Tuesday, February 17) in the large dining hall of the Auditorium Hotel was the greatest, numerically, that has ever been congregated.

The dinner was good, the toasts were fine, and the speakers were well chosen.

Dr. C. N. Johnson presided. I never gave him credit for being such a success as toast-master, but he certainly was the right man in the right place that night.

The new president, Dr. F. B. Noyes, was introduced by Dr. C. N. Johnson, the retiring officer. His speech of acceptance was very pleasing and terminated with quite a touching scene to the onlooker, when he refused to take the helm but touchingly prevailed upon Dr. Johnson to continue to preside the remainder of the evening.

Oh, such a time as the guests at Chicago had.

Dr. Black administered his kindly care and attention. Dr. Harlan would have done more as an entertainer if permitted Dr. Johnson had his hands full until long after the festivities were supposed to cease, and for aught I know may be still at it. It is not sufficient to say that those who had the management of the clinics, essays and exhibits (oh, yes, the exhibits, there were about seventy of them, but there seemed to be about 700) deserve congratulations. They certainly deserve much more than that.

But to come back once more to my own stamping-ground and tell you what is going on in New York.

January is the month in New York for the "*annual*" meetings of most dental societies, but there is one reserved for the month of February which is always attractive. The Central Dental of New Jersey always holds its annual in February, on the anniversary of its incorporation.

This year was its *twenty-third* annual banquet, and as usual was full of good things. One hundred and twenty-six sat around the board. Remember this is only a *local* society—meeting monthly in the city of Newark, N. J., but its membership extends all over the northern part of the State, and better, that membership *attends* the meetings. There is never a meeting but what there are several members present who have come from forty to sixty miles to attend. Evidently they like their society and men from other States like it also, judging from the members who attend. The dinner this year was not so rich and prolonged as in former years. It was probably a good thing, however, for the committee had wisely limited the speakers to a few moments each, and since the company had not dined too heavily the meeting closed at a reasonable hour instead of being prolonged as has usually been the case until midnight or after. For this the committee, of which Dr. Chas. A. Meeker is chairman, deserves great credit.

Some of the sentiments expressed at the banquet were "sharp as incisors and others ground as finely as molars, while they all proved to be the happy bridge that led from business cares and social joys," to quote from a Newark daily.

After the president had made his short address of welcome, that old "war horse," Dr. Chas. S. Stockton, was introduced. He said in part:

> I find myself up against a toast that is difficult to down, because there are so many conflicting views presenting themselves. But it is evident the millennium has not come yet, or at all events, it has not been hailed off Sandy Hook, nor has the wireless telegraph announced its approach. Some people assert that we are constantly degenerating instead of improving—that the golden age is to be looked for in the past and not in the future. They cry "The good old times, the grand old times. What times they were. They were the only times. You don't call these times, do you?"

In the old times, famine or disaster might exist and we had no knowledge of it, while to-day we know it immediately and relief is at once at hand.

Formerly we knew nothing comparatively of the world's doings, while to-day every event of any importance is brought at once to our attention, and hence because of this knowledge the world does seem to be growing worse.

It is a fact that nearly every invention which fills the world with necessities and luxuries has been discovered within a period of not exceeding two hundred years. Steam, printing, the cotton gin, electricity, anesthetics, a knowledge of the stars, photography, the telephone and various others, not to mention such astounding developments as wireless telegraphy and a possible air ship, the universal dissemination of knowledge and the ignorance of the old times are equally astonishing.

He then compared the "Past and Present," referring to some petty jealousies within the circle of the society, and declared that when these jealousies were relegated to the past the "era of good," as far as the C. D. A. was concerned, would be complete.

"Brer" Walker, whom we all know so well—East, West, North and South—responded to "Milk and Honey." He did so in the most successful manner, highly complimenting his brethren of New Jersey upon the fine showing made by their society. It was to its credit, he said, to get so many busy men together on such a night in order to give each other fraternal greeting. Then he expressed regrets that some of the "dear old boys," as he called them, had passed away, and advised the younger element to model after them if the high standard of the society is to be maintained.

Dr. Wm. Jarvie, unfortunately, was too sick to appear.

Dr. Hindle, president of the State Society, urged the members to attend the convention in Asbury Park, July 16–17, which, he prophesied, would the greatest in the history of the society. Then he praised the officers for what they had done during the past year and was rewarded for his efforts by the members singing "Oh, Mr. Hindle" to the tune of "Mr. Dooley."

Dr.—Professor I should say—R. M. Sanger, responding to "Some Sentiment," said among other things that the present age was one of "hustle," and that in order to "keep up with the band-wagon" dentists like everybody else must hustle or "get left."

The meeting of the Odontographic Society in your town caused some absences from this banquet. Telegrams were read from Dr. H. S. Sutphen, one of the C. D. A's., from Dr. R Ottolengui, and from Drs. Johnson and Bentley; this latter conveying the greetings of the Odontographic.

Dr. Ottolengui said, "My corporal body is here (Chicago), my astral body with you, save me a corkscrew."

This latter had reference to the souvenir of the evening, which was a silver tipped corkscrew labeled, "Warranted to Extract Without Pain."

After the speeches came the business meeting and election for the ensuing year. Following is the list of officers elected, as copied from a Newark, N. J. paper: President, Dr. William H. Pruden, of Paterson; vice-president, Dr. C. W. Hoblitzell, of Jersey City; Secretary, Dr. Frederick W. Stevens, of this city, Treasurer, Dr. Charles A. Meeker, of this city. Executive committee: Dr. Joseph S. Vinson, of this city; Dr. W. W. Hawke, of Flemington; Dr. T. Star Dunning, of Paterson; Dr. Frank L. Manning, of Elizabeth; and Dr. John A. Voorhees, of this city.

The February meeting of the Institute of Stomatology, following the new departure, was held at the Chelsea, preceded by a dinner at 6:30, to which about fifty members and guests sat down. After a few communications on theory and practice, Dr. Herbert L. Wheeler, of New York, read a paper on "Porcelain." The program said, "he will deal with certain chemical and physical principles not much written upon." Apparently that was along the line of the difference between *glass* and *true porcelain.* Dr. Wheeler claiming that many of the products now on the market are not true porcelains. His paper was ably discussed by Drs. W. A. Capon, of Philadelphia; Robert D. Moffatt, of Boston, E. A. Bogue, of New York and Henry W. Gillette, of New York.

At the January meeting was instituted the holding of a clinic in the latter part of the afternoon, going from the clinic to the dinner. This month—February—the clinic was repeated, being held at the joint office of Drs. F. Milton Smith and Geo. S. Allan, 51 West 37th St. This clinic is more for the exhibition of finished work or work in progress than for the actual performance at that time. Among other things shown on this occasion were some excellent approximal porcelain inlays, which Dr. F. Milton Smith had inserted some two years ago or more.

The regular meeting of the Second District Dental Society, which takes place in Brooklyn Borough, was held February 9 at the residence of Dr. R. C. Brewster, 126 Lefferts Place, Brooklyn.

Dr. J. Bond Littig read a paper entitled, "Simple Methods Employed in Orthodontia."

The rooms were filled to overflowing, for it has been a difficult thing to persuade Prof. Littig to read a paper, and we all knew it would be worth listening to. It was a short essay, but he had a large number of models with various appliances. A very pleasant and instructive hour was passed in listening to his description of what was done in each case and asking questions of the professor.

In the discussion which followed Dr. Ottolengui spoke at some length, describing among other things how he expands the arch, claiming that he does not move the teeth in the process (that is in most cases), but opens the suture.

Among those who joined in the discussion were Drs. L. C. LeRoy, of New York; Dr. Ellison Hillyer, of Brooklyn; also Drs. Barker, Hutchinson and Dills.

Previous to the reading of Dr. Littig's paper, Dr. Ottolengui had a lively tilt with Dr. D. W. Barker over some reference to "extension for prevention" *a la Ottolengui* in the filling of children's teeth with gold, in which some references were made to the "dental parlor men" and quite an interest provoked. As a result we are to be treated to an interesting paper ere long by Dr. Barker.

Dr. John Meyer, of New York, showed a very ingeniously contrived upper plate for a patient who had such a malformed mouth that no suction could be obtained, there being a large opening directly through the roof of the mouth, really a widened cleft of the hard palate. While the patient retained some teeth, clasp plates were worn, but when the last tooth was removed something had to be done to make the plate "stay put." Dr. Meyer contrived a pair of light metal wings which when closed would pass through the opening—when by touching a small lever the wings opened and engaged with the rim of the orifice in such a manner as to hold the plate firmly. "THE BOROUGHS."

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, The DENTAL REVIEW, 55 State St., Chicago, Ill.]

Treating an Alveolar Abscess with Formaldehyde.—A blind, or chronic abscess can be treated with good results by using a three per cent solution of formaldehyde. If the pus pocket is very large, however, a one per cent solution is preferable.

W. H. G. LOGAN, Chicago.

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To Prevent Plaster from Adhering to Rubber in Vulcanizing.—Coat the surface of the model with collodion before closing the flask. C. W. RICHARDSON, Marengo, Ill.

[NOTE.—Liquid silex also can be used in the same manner with good results.—EDITOR.]

◆

Cleaning Glass Cement Slabs.—Every practitioner knows how difficult it is to remove the cement which adheres to a glass cement slab. Usually a knife is resorted to and the slab presents a scratched appearance therefrom. I accidentally discovered that dilute nitric acid will remove all cement particles no matter how hard, and the slab, after being rinsed in water and dried, will have a clean, smooth surface.

GEORGE ZEDERBAUM, Charlotte, Mich.

◆

Method of Mixing Amalgam.—Arrange a piece of rubber dam over the palm of one hand and upon this place the alloy and mercury. Gather up the corners and edges of the rubber and twist together in the manner that a chamois skin would be used for the same purpose. Hold the twisted portion of the rubber with one hand, place the bulbous portion containing the alloy and mercury against a flat, smooth surface, and roll vigorously with the other hand. The advantages of this method will suggest themselves when tried. R. L. GRABER, Peoria, Ill.

Setting Crowns and Bridges.—In setting a bridge, or a banded crown, the cement which is pressed between the gum and root is sometimes difficult to remove, and in cases where a saddle is used it is almost impossible to remove the surplus cement which is forced under the saddle. Cement if allowed to remain in contact with the soft tissues acts as a constant irritant and should be avoided. An easy method of preventing the cement from being forced between the soft tissues and the bridge or crown while it is being pressed to position is to coat with oil all surfaces of the metal that comes in contact with the gums. The oil will prevent the surplus cement from adhering to the metal, causing it to be pressed out where it can be readily removed.

W. H. G. LOGAN, Chicago.

◆

Method of Attaching a Cusp to a Band.—After the cusp has been swaged and fitted to the band it can be attached in the correct relation in a very simple manner before removing the band from the model on the articulator. Arrange the cusp in its correct position on the band, place a little asbestos fiber over the occlusal surface of the cusp and close the articulator. Care must be taken that the cusp is not forced out of position when the opposite teeth are brought in contact with the asbestos. The cusps of these teeth will sink into the asbestos, holding the metal cusp firmly against the band and the articulator can be held closed with a piece of wire. The cusp and band can now be united at a convenient point with a small piece of solder and can then be removed from the model, and the soldering finished in the usual way.

◆

Polishing Porcelain.—We hear a great deal said about the necessity of fusing the surface of a porcelain inlay after it has been ground to shape in order to obtain the requisite glossy appearance, but this is wholly uncalled for. As perfect a polish may be given porcelain as can possibly be given gold or any of the metals. Grind the inlay or crown to the proper form, then go over the surface with a sandpaper disk, to be followed by a cuttlefish disk. Then take some oxide of tin polishing putty and with wooden points known as Barker's porous polishers, as beautiful a surface may be given to porcelain as can be imparted to it by the furnace. By this method inlays may be ground at will, with the perfect assurance that a satisfactory finish may be given without fusing again. Dr. C. F. Hartt, Chicago.

[We can vouch for this "hint" as being all that it claims. Through the kindness of Dr. Hartt we have tried this method and the results are really beautiful. We have never before seen so satisfactory a surface on porcelain as this procedure gives and we advise our readers to try it.—Editor.]

Be Brief.—Did it ever occur to you that you were largely responsible for the unsatisfactory way in which a mail order is filled by a dental supply house? If Dr. Coldfacts was in need of one-half dozen new window shades and sent an order to a house supplying such goods it would read as follows:

Kindly send the following goods by earliest mail:
2 Holland shades........2.6x8.0, color, buff.
2 Linen " ....3.0x9.2, " white.
2 Denham " ....2.1x9.3, " olive green.

This order would be filled with dispatch because it is brief and comprehensive, but if, on the other hand, the order was made complex by the addition of descriptive matter foreign to the order in question, it could not be, on account of the confusion in the mind of the one who is trying to fill it. Should Dr. Coldfacts state in his order that he was building a new office on the other side of the street and wanted the Holland blinds on the north windows as they would not interfere with the light, and he desired buff because it was in harmony with his complexion and other office furnishings, etc., it would make his simple order almost unintelligible. In sending in your mail orders tell what you want in as few words as possible. Write your order and letter on separate sheets and be sure that your order is written so plain and so simple that you could read it yourself after the ink was well dried.

[Note.—The dental supply houses would furnish comprehensive order blanks to their mail order customers if stimulated to do so by a demand for such blanks.—Editor.]

Treating Children's Teeth.—Children are seldom taken to a dentist for the first examination until some trouble with the teeth has made it necessary, usually an aching tooth. The first thing that the dentist should try to accomplish is to gain the confidence of his little patient. He can do this in various ways, but no dentist can be absolutely successful in treating children's teeth unless he loves children. At the beginning of the first sitting the condition of the mouth can be examined superficially without having an instrument in sight—not even a mouth mirror. A child is not afraid of a person's hands. If it is found necessary to use instruments for the first treatment the dentist can safely do so only after he has become somewhat acquainted with his patient, and in most cases he can accomplish this in a short time. The first sitting should not be a long one, and the treatment should consist in merely trying to relieve the pain, if only temporary. After the patient has become somewhat accustomed to the dental office and realizes that the operation is not so severe as was supposed, the dentist can proceed carefully to more permanent treatment. One point should always be kept in view and that is that an operator should never use a bur in an engine the first time on a sensitive tooth with a live pulp, where it is possible to avoid it. Very often a child has a deciduous tooth with a dead pulp that is not giving trouble. That is the tooth that the dentist should start to use the engine upon. The child may resist at first on account of having heard such dreadful things about that engine, but the operator knows that it will not give pain if he is careful, and after having cleaned the cavity thoroughly with a bur in the engine, the fear of the patient is dispelled, and the engine can be used ever afterward with better success than if pain is given the first time it is used.

◆

Things to Remember.—Remember, no matter how deep the lingual side of the lower jaw, do not extend the plate any lower than it ceases to be lifted when the tongue is raised to the palate. Remember, that *weight* is not an essential factor in a lower denture, nor is lack of weight an essential factor on the upper jaw. If the denture is properly fitted, has a fair adhesion, and is properly articulated, the patient does not realize weight.

Remember, that more failures occur from *faulty occlusion* than from any other cause. The plate may fit well, the adhesion be strong, and yet when the jaws close the denture may be displaced, and especially if the anterior teeth interfere. Never allow them to meet.

Remember, that the center of the upper jaw does not change and that as the alveolar ridge does change, unless provision is made to prevent, the plate, sooner or later, will rock. If there be the usual vacuum cavity the anterior and posterior margins will rock over the hard center.

The preventive is to dispense with the vacuum cavity as unnecessary, and make a relief over the entire hard center, extending from near the top of the ridge to within one-quarter inch of the back of the plate. In a metal plate use a thin film of wax. In a rubber plate scrape the impression or the plate when finishing.

Remember, that the extraction of the cuspid teeth affects the expression of the lip more than anything else, but it can be restored by extending the plate higher and making the gum fuller than in front.

Remember, that in the case of a flat, ridgeless jaw, better results can be secured with a metal plate than with rubber.

Remember, that on the left side of the upper jaw in 95 per cent of cases, there is more depression over the cuspid eminence, and the ridge shorter, than on the right side, so that in arranging the teeth and gums provision should be made for the difference.

Remember, that in very many artificial dentures the teeth and gums are too short and the mouth is in a state of collapse, and it is more difficult for the patient to masticate.

L. P HASKELL, Chicago.

MEMORANDA.

RUNNING THE GAMUT.

FLIPPER—What made him lose faith in human nature?

FLAPPER—He bought an unbreakable comb, took a dose of tasteless cod-liver oil and visited a painless dentist.—*Smart Set.*

LOUISVILLE, KY., Feb. 18, 1903.

The Kentucky State Dental Association will hold its annual meeting at Bowling Green, May 19, 20 and 21. All are invited.

DR. C. R. SHACKLETTE, *Secretary.* DR. J. S. CASSIDY, *President.*

The Central Michigan Dental Association will hold its next meeting in Grand Ledge, Mich., May 13-14. There will be special features at the banquet and an interesting program is assured. Arrange to attend.

Remember, at Grand Ledge, May 13 and 14.

P. L. CAMPBELL, *Secretary,*
Ionia, Mich.

DR. A. H. THOMPSON'S BEREAVEMENT.

We regret to announce that Dr. A. H. Thompson, of Topeka, Kan., has suffered a serious loss in the death of his wife. Mrs. Thompson was a woman of more than ordinary attainment, added to which was a charitable, loving nature, which drew to her the friendship and esteem of a large circle of acquaintances. Dr. Thompson may be assured of the heartfelt sympathy of his professional associates wherever he is known.

CONGRATULATIONS.

The following from the Washington press dispatches would indicate that the government is beginning to take cognizance of our profession when appointments of this kind are being made by the president:

"Dr. A. W. Harlan and Dr. T. W. Brophy, of Chicago, will, upon the recommendation of Senator Cullom, represent the United States at the fourteenth annual international medical conference to be held at Madrid next April."

MAY LEAD TO GREAT BENEFITS.

Dr. D. D. Smith, a dentist, read before the Philadelphia County Medical Society yesterday, by invitation, a most interesting and exhaustive paper, entitled, "Mouth Infection," which was discussed by many of the members present. The general consensus of opinion was that Dr. Smith had opened up a new field for thought and investigation, the outcome of which would be of great interest and incalculable benefit to humanity in general.—*Philadelphia Evening Telegraph.*

DENTAL LAW FOR THE PHILIPPINE ISLANDS.

Through the kindness of Dr. Louis Ottofy we have been furnished with the text of the new dental law passed January 10, 1903, regulating the practice of dentistry in the Philippine Islands. The dental board consists of three members appointed by the commissioner of public health, and they must be "graduates in good standing of legally incorporated dental educational institutions recognized by the National Association of Dental Faculties, and the National Association of Dental Examiners of the United States of America."

LOUISVILLE COLLEGE OF DENTISTRY.

The annual meeting of the Alumni Association of the Louisville College of Dentistry will be held in the College Building at Louisville, March 27, 28, 1903. An exceptionally good program has been arranged for this meeting consisting of seven papers and some forty clinics. The entire dental profession are welcome. Come.

W. M. RANDALL, *Secy.*
419 Chestnut St., Louisville, Ky.

The New York *Medical Critic* announces that each subscriber to that journal will receive a free copy of the *Medical Index* next Month (March, 1903).

The volume will contain names, place and date of publication, price, circulation and names of editor and publishers of over 600 of the principal medical publications in this country and abroad, and also the titles and authors of each article published during the year 1902, arranged according to subjects and alphabetically. When it is noted that the list is complete up to January, 1903, it should prove especially valuable in bridging over the period which has elapsed since the index medicus was discontinued.

Considering the expenditure of time and money in the preparation of this volume, and the liberality of the publishers in presenting it free to the profession, the enterprise marks a new era in medical journalism and merits appreciation and success.

RECENT PATENTS OF INTEREST TO DENTISTS.

713,273. Dental matrix crown, Isaac H. Alexander, Camden, S. C.

713,282. Dental chair, Arthur W. Browne, Prince Bay, N. Y., assignor to S. S. White Dental Manufacturing Co., Philadelphia, Pa.

713,103. Dental engine, Frank Hurlbut, Chicago, Ill.

713,453. Tooth crown burnisher, Jason D. Kinsley, Lisbon, Iowa.

713,319. Dental tool holder, Charles A. Lundberg, assignor to Consolidated Dental Manufacturing Co., New York, N. Y.

713,469. Dentistry, George G. Martin, Pecos City, Texas.

713,470. Dental forceps, Wesley T. Martin, Yazoo City, Miss.

713,330. Mold for forming artificial teeth, Michael J. Murray, assignor to Consolidated Dental Manufacturing Company, New York, N. Y.

714,105. Dental heater, George Evans, assignor to Evans Company, New York, N. Y.

713,683. Toothbrush, Homer Poling, Curtin, assignor of one-half to N. Poling, Millstone, W. Va.

713,826. Dental handpiece, John D. Wilkens, assignor to Dental Protective Supply Company, Chicago, Ill.

714,373. Electrical dental furnace, Ashley M. Hewett and J. C. Smith Chicago, Ill.

714,613. Handpiece for dental engines, Adolph W. Schramm, E. B. Wilford and B. Fulton, assignors to Electro Dental Manufacturing Company, Philadelphia, Pa.

715,005. Fountain spittoon, John C. Blair, Louisville, Ky.

714,901. Toothpick, James E. Hills, New York, N. Y.

714,694. Adjustable wall bracket, Gustav Holtz, Jamesburg, N. J., assignor to American Dental Manufacturing Company, of New Jersey.

714,938. Dental oven, John A. McClelland, Chicago, Ill.

715,216. Means, for producing dental amalgam, A. A. Shaw and R. A. Stevens, Cambridgel Mass.

715,182. Denta flask, Wm. Waegel, Reading, Pa.

714,983. Dental instrument, Cecil P. Wilson, Newton, Mass.

718,561. Attachment for dental engines, Claude R. Basford, Healdsburg, Cal.

718,401. Dental finishing strip package, Jacob A. Thomas, Hanover, Pa.

718,614. Artificial tooth crown, Hermann Friedland, Mayence, Germany.

718,772. Dental napkin holder, Henry A. King, New York, N. Y.

719,312. Dental disk holder, Edward J. Douhet, Cleveland, Ohio.

719,017. Toothpick, Albin Lenhardtson, Stockholm, Sweden.

719,834. Dental matrix retainer, John Mills, Brantford, Canada.

719,964. Artificial tooth, Walter F. Wheeler, Spencer, Mass.

719,928. Manufacture of dental crowns, Evart V. Williams, Argyle, Wis.

720,394. Dental charcoal point, Louis Arndt, Jersey City, N. J.

720,105. Dental impression cup, George A. Brouillet, Boston, Mass.

Copies of the above patents may be obtained for ten cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

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THE

DENTAL REVIEW.

VOL. XVII. CHICAGO, APRIL 15, 1903. No. 4

ORIGINAL COMMUNICATIONS.

TEMPORARY AND PERMANENT FILLINGS AS BARRIERS TO BACTERIA.*

By A. E. WEBSTER, M. D., D. D. S., L. D. S., TORONTO, CANADA.

The attention of the profession has never been called to the possibility of many fillings, both temporary and permanent, not being barriers to bacteria. The experiments here reported cover quite completely what are known as temporary fillings, such as sealings for dressings, etc., and to a limited extent root canal fillings, and what are known as permanent fillings, cements and amalgams.

TEMPORARY FILLINGS.

In discussing the question of temporary fillings used to seal dressings into root canals, it is taken for granted that the most desirable substance is that which will absolutely prevent the fluids of the mouth from getting into the canal under treatment, or the contents of the canal from escaping in the oral cavity. Of course the material which is the most easily manipulated is preferable if it has the above qualities. So that it may be positively shown that the materials used to seal dressings into teeth, or used to fill teeth and root canals, have or have not the power to prevent the passage of bacteria; the tests must be made in the laboratory. It would be wholly impossible to do accurate work in the mouth, because there are besides many other complicating conditions, certain vital influences which cannot be accurately foretold. But to prove the plain scientific fact as to whether bacteria can be dammed out of a root canal by cement or gutta-percha must be done in the laboratory. If all the conditions are made the same as those in the mouth except the vital, which is a variable one and cannot be depended upon in the treatment of any case, the results must be of practical value. The fillings used in these experiments were inserted as far as possible under the same conditions as those that exist in the mouth.

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*Read before the Fifteenth Anniversary Celebration of the Odontographic Society of Chicago, February, 1903.

Glass tubes, with a fourth-inch bore and about two inches long, sealed at one end and a slight constriction about a quarter of an inch from the other, were filled with bouillon, or beef broth, up to the constriction and the open end plugged with cotton. These were sterilized on three consecutive days. The cotton plug was then removed and the sealing or temporary filling inserted, using ordinary care and cleanliness. After the tubes were filled they were immediately immersed in a beaker of freshly collected saliva. The tubes were allowed to lie upon their sides so the bouillon might come in contact with the stopping. The beaker containing the tubes was placed in the incubator at 37 c, and at the times stated in the following tables the tubes were taken from the saliva and examined as follows:

Sterile water was allowed to flow over them, they were then wiped dry and with a file the tubes were nicked at the neck and the end broken off with a blow from the file, thus exposing the bouillon. Three loopfuls of this bouillon were then spread upon agar, the test tubes containing the agar were placed in the incubator and examined at intervals until it was certain that no growth was likely to occur. Where a growth occurred it was in many cases stained, and examined under the high power of the microscope. Control tubes were carried through with many of these experiments. These tubes were put through the whole process except the immersion in the saliva. Thus if these tubes which were not put in the saliva were not infected, and those which were put in the saliva were infected there is only one conclusion, and that is that they were infected from the saliva. Besides this a beaker of bouillon was infected with bacillus Pyoceaneous, which imparts a distinct green color to the media. Tubes immersed in the solution become infected with this organism.

A good deal is sometimes said about the advantages of one sealing material over another. So that a basis may be had for a conclusion on this point, and also to illustrate many others; below is a full report of series—D—where all the tubes were put into the same beaker of saliva at the same time and tests made of each variety at the same time.

SERIES D.

GUTTA PERCHA.

10 tubes put into saliva.

In 24 hours 2 tested, both infected.
In 48 hours 2 tested, both infected.
In 72 hours 6 tested, all infected.

Temporary stopping.

10 tubes put into saliva.

In 24 hours 2 tubes tested, both infected.
In 48 hours 2 tubes tested, both infected.
In 72 hours 6 tubes tested, all infected.

Oxyphosphate. (Weston's.)

10 tubes put into saliva.

In 24 hours 2 tested, both infected.
In 48 hours 2 tested, both infected.
In 72 hours 6 tested, all infected.

Cotton and Sandarac.

4 tubes put into saliva.

In 24 hours 3 tested, all infected.
In 48 hours 1 tested, and infected.

Oxychloride. (Ames.)

In 24 hours 2 tested, no infection.
In 48 hours 1 tested, no infection.
In 72 hours 1 tested, no infection.

One tube broken.

In other series Oxychloride has resisted infection for 60 days. There is no reason for believing that it will not stand out a much longer time.

Vaseline mixed with cotton and whole covered with cement.

5 tubes put into saliva.

In 24 hours 1 tested, no infection.
In 48 hours 1 tested, and infection.
In 72 hours 3 tested, and infection.

To sum up—Gutta percha, temporary stopping, cement, cotton and sandarac, cotton vaseline and cement, or gutta percha, are of no value to seal a cavity in a tooth to prevent infection from the oral cavity. A sealing that will not prevent the passage of bacteria for more than 24 hours cannot be depended upon, even if a disinfectant be sealed in the cavity, because most disinfectants sealed in the manner described soon become dissipated. Such a drug as carbolic acid sealed with one of the above sealings will lose its potency in from two to three days, and the cavity becomes infected. There are drugs, however, which will resist infection for weeks under such circumstances. Although the temporary filling materials mentioned may not have the power to prevent the passage of bacteria, they are not useless as sealings so long as the drug sealed in the cavity has the power to prevent bacteria from passing it to infect beyond.

It will be well to state at this time that all sealings of cotton or those containing cotton are objectionable, because they soon become saturated with saliva and food juices. They are really incubators. As they are squeezed in the act of mastication millions of bacteria are forced out to infect the alimentary tract, while more food juices are absorbed to renew the activity of the growth; besides this they allow the dissipation of the drug from the dressing and the re-infection of the cavity or root canal.

Oxychloride of zinc, which appears in series D, did not permit the passage of bacteria. Nor has it permitted the passage of bacteria after being immersed in saliva for 60 days. From these experiments and many others it is clear that oxychloride of zinc is a safe sealing for all open cavities in teeth.

PERMANENT FILLINGS.

It is to the second subject under discussion that attention is directed most particularly at this time. "Do amalgams, cements and gutta percha, when used as permanent fillings or as root fillings, prevent the passage of bacteria?" Accurate technique was desired because these materials are used as mechanical plugs for cavities in teeth rather than depending upon any antiseptic quality the material might possess. In most cases where a temporary filling leaks there is still the disinfectant dressing to overcome before infection may take place, but not so with a mechanical filling.

Being satisfied that the foregoing experiments had some bearing on mechanical root canal fillings and cavity fillings further experiments were undertaken.

SERIES E.

Ten tubes made as Fig. 1 were filled with bouillon, mouth plugged with cotton and sterilized three consecutive days. Cotton plug removed from the neck, moistened with eucalyptus, then chloropercha pumped into constriction and a gutta percha cone made to fit and forced home, not using much heat, the packing continued until the gutta percha was perfectly cool. The remaining portion of the tube was filled with cement (Ash). About twenty minutes after the tubes were filled nine were placed on their sides in a beaker of saliva, one held as a control, the tubes being completely covered. The beaker was placed in the incubator and tests made of the contents of the tubes as follows:

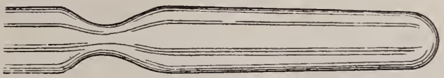

FIG. 1.

SERIES E.

In 1 day 1 tested, no infection.
In 2 days 1 tested, no infection.
In 3 days 1 tested, no infection.
In 4 days 1 tested, infected.
In 5 days 1 tested, no infection.
In 7 days 1 tested, no infection.
In 9 days 1 tested, no infection.
In 14 days 1 tested, infected.
In 17 days 1 tested, infected.
In 17 days control tested, not infected.

Series E having shown a protective power for root canal and crown fillings for only fourteen days, it was determined to insert some amalgam fillings, some cement fillings and gutta percha root fillings, covering with cement, and gutta percha root fillings covered with a layer of oxychloride and then oxyphosphate over all, using the greatest possible care in their insertion, as to mechanical correctness and technical correctness from a bacteriological standpoint.

Heavy glass tubes two inches long and one-quarter of an inch bore were drawn to a fine neck about a quarter of an inch from the end, the remaining quarter of an inch was made into a cylindrical bowl with a solid rim and a flat base, the center of the base having a fine hole leading to the tube below. Fig. 2.

The inside walls of the bowl were ground with a stone so that they became rough, similar to the walls of a recently prepared

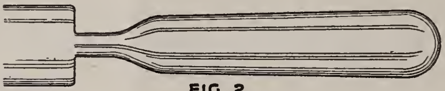

FIG. 2.

cavity in a tooth. Bowls were plugged with cotton and sterilized in dry air at 160 c. for one hour, then filled almost to the constriction with bouillon. Cotton plugs replaced and tubes sterilized in live steam for 20 minutes on three consecutive days.

FILLING BOWLS WITH AMALGAM.

Alloy, mercury, mortar and pestle, and instruments used in inserting fillings were sterilized in dry air at 160 c. for one hour; sterilizer was then allowed to cool to 37 c. Thus the tubes, the instruments, the filling materials and saliva were all of the same temperature, 37 c. The filling materials were mixed and placed in the bowls of the tubes in the sterilizer at body temperature and maintained at that temperature until tested for infection. In this way there could be no possible chance of error by an unequal expansion or contraction of the glass or the filling materials between changes of temperature. Within ten minutes of the bowl being filled with the amalgam the tubes were immersed in the beaker of saliva. The beaker was then placed in the incubator, which was maintained at a uniform temperature, 37 c. In all thirteen tubes were filled, ten put in the saliva and three control tubes put through all processes except being placed in the saliva. Some of the amalgam mixed was imbedded in agar and put in incubator. In no case were the material, instrument points, or contents of tubes touched with the hands. As far as possible every source of infection was guarded against.

13 tubes filled, 10 put in saliva.

SERIES F.

In 7 days 2 tubes tested, 1 control, and 1 from saliva, neither infected.

In 16 days 1 tested, not infected.
In 39 days 1 tested, not infected.
In 47 days 1 tested, not infected.
In 52 days 1 tested, bouillon cloudy but no growth on agar.
In 61 days 1 tested, not infected.
In 66 days 1 tested, infected.
In 73 days 1 tested, infected.

The manner of testing or deciding whether an infection had occurred or not was the same as that previously described under control fillings.

CEMENT TESTS.

SERIES G.

A test of Fellowship cement under the conditions aforementioned was made with the following result:

13 tubes filled.
10 tubes put in saliva, in 7 days 10 tested, 4 infected.
3 control tubes not put in saliva, 7 days, were not infected.

SERIES H.

Ash Cement.

5 tubes filled.
4 put in saliva, in 8 days 4 tested, all infected.
Control not infected.

SERIES I.

Justi Cement.

5 tubes filled.
4 put in saliva, in 8 days 4 tested, 1 infected.
Control not infected.

Root Fillings.

The same heavy tubes were used in these experiments, only having the necks drawn out much longer, Fig. III, so as to make a fine root canal. All were filled under same conditions of care, etc., as preceding, canals lubricated with chloro-percha and gutta percha

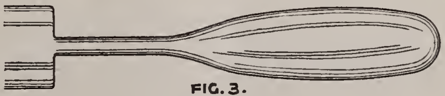
FIG. 3.

cones forced home, using little heat and good pressure. There is a serious objection to heating gutta percha very much when filling a canal. It greatly contracts on cooling. About a half hour after the canals were filled the bowl was filled with cement. As soon as the cement was set the tubes were placed in the saliva.

SERIES J.

11 filled.
11 tubes put in saliva.
In 8 days 1 tube tested, not infected.
In 13 days 1 tube tested, not certain, but likely infected.
In 20 days 1 tube tested, and infected.
In 28 days 1 tube tested, and infected.
In 32 days 1 tube tested, and infected.

In another series canals were filled as above, and over them was placed a thin layer of oxychloride and over all the same cement, as in the previous series.

SERIES K.

7 tubes filled.
In 6 days 1 tested, not infected.
In 13 days 1 tested, not infected.
In 20 days 1 tested, not infected.
In 28 days 1 tested, not infected.
In 33 days 1 tested, not infected.

In another series the canals were as well filled with gutta percha as possible, slightly warming them and using no lubricant nor filling the cavity with cement.

SERIES L.

5 tubes were put in saliva.
In 24 hours 5 were tested and 2 were infected.

The above experiments are only a corroboration of work done by the author some years ago and published in the April number of the *Dominion Dental Journal,* 1900. The experiments at that time were made in a purely mechanical way, but they pointed directly to what was suspected at that time and to what has been shown by more recent investigation. The ordinary root canal filling is not a barrier to either moisture or bacteria. The author when making the experiments did not dream of the infection of a root canal from the oral cavity, but was directing attention to the possibility of closing the apical end of the root canal only. To quote from the paper in question: "If a root canal ought to be filled there must be some reason for it. The best and only reason for filling a root canal is to keep something out of it that is undesirable. That undesirable something is most likely moisture or granulation tissue, or both, with a probable pyogenetic infection. It is fair to assume that a filling material that will prevent the passage of moisture will prevent the passage of bacteria and granulation tissue. This being granted, the relative merits of absorbent cotton, raw cotton, gutta percha, and the cements as barriers to the passage of moisture and hence the passage of bacteria can be seen from the following experiments. It must be borne in mind that these experiments do not relate in any way to the solubility, destructibility, density or irritating qualities of the material used."

Glass rods about two inches long with three-sixteenths of an inch bore were drawn to a fine point at one end, while the other end remained its original size. In this way a cone was made about three-quarters of an inch long and resembling the root canal of a tooth. In all cases these cones were opened clear through. When they were filled with the root canal filling material their small ends were immersed in a red colored solution. This was accomplished by passing the tubes through holes cut in a piece of cardboard and the cardboard placed over a shallow pan containing the red solution. The tubes were held in an upright position, while only their small ends were below the surface of the solution.

Below is a tabulated form of the experiments arranged in the order in which they acted as barriers to moisture:

SERIES M.

Material.	Tubes.	Hrs. Time.	Colored.	Not Colored.
Chloro-percha and gutta percha points	10	48	3	7
Gutta percha	13	48	6	7
Oxychloride	13	48	11	2
Absorbent cotton (large end of tube sealed)	26	24	24	2

Material.	Tubes.	Hrs. Time.	Colored.	Not Colored.
Cotton and chloro-percha........	10	48	8	2
Raw cotton	22	48	22	..
Absorbent cotton	7	24	7	..
Oxyphosphate (Ash)	12	72	12	..
Oxyphosphate (Hammond)	13	48	13	..

Thus it would appear that if there were moisture at the end of a root canal, practically none of the above materials would prevent its passage into the tooth cavity.

I approach the summing up and the drawing of conclusions from the work I have done with some misgivings. First, because of the incompleteness of the work done, and, second, because it is quite possible to come to a wrong conclusion, though the premises may be correct. Again, the conclusions arrived at may not be wholly based upon the experiment here reported, because a great deal has been done that if now reported would only weary you. However, it may be safely stated that oxyphosphate cements, gutta percha, cotton, or any combination of these with each other, or with any other undisinfecting materials will not prevent the passage of moisture or bacteria. Oxychloride of zinc will prevent the passage of bacteria for at least 60 days, but not moisture for that length of time. Some amalgams if properly mixed and inserted will resist the passage of bacteria for two months, and others will not resist bacteria for three hours, no matter how mixed or inserted. There are doubtless many questions arising in every active mind here. Have you tried this or that cement, or so and so's gutta percha, or what amalgams leak or what do not? Do the bacteria pass through the substance of the material, or do they pass between it and the walls of the cavity? After testing ten or twelve cements of different names my conclusion is, that they all leak; those that do not shrink allow the passage to take place through the mass. The only difference is, that those that shrink leak sooner than those that do not. Only a few amalgams have been tested, but it is quite likely that only those leak that contract or flow badly.

Root canal fillings made by heating gutta percha cones and packing them with an instrument that penetrates the material are not so resistant to either moisture or bacteria as those made by first using chloro-percha, and then carefully forcing the proper sized cone into the canal without puncturing or heating. When gutta percha is heated it seems to have a tendency to creep, and unless it is held with continuous pressure until it is hard, spaces will appear around it. Notwithstanding its defects, chloro-percha and gutta percha root fillings are the best resistants of moisture among those materials examined, but its power to resist either moisture or bacteria is not great enough to make it an ideal root filling.

In the light of what is shown in series E, D, etc., and in table M, consider a tooth in which the pulp has been devitalized and removed, the root canal filled with gutta percha and the crown filled with cement or an artificial crown cemented on, or the tooth used as an abutment for a bridge which is set in cement. It is almost certain that bacteria will have penetrated from the oral cavity clear through the cement filling and gutta percha root filling in less than a month, if the resistance of the living tissues do not prevent it, and we know that they very often do not. It is quite possible and in fact probable that there are more alveolar abscesses on treated and filled teeth due to direct infection from the oral cavity than from an infection from the general circulation. It is quite clear from these experiments that if there be moisture or bacteria at either end of a tooth filled with cement or gutta percha they will be absorbed and kept in abeyance only by the resistance of the living tissues; but as soon as this resistance is lowered or the dose very much increased the tissues about the apical foramen are invaded and an alveolar abscess is imminent. Many filled teeth are kept in a lame condition for years because of the continued irritation of an infection about the apex.

Since a root filling made by first moistening the canal with eucalyptol and then pumping chloro-percha into it and into this forcing a gutta percha cone is the best resistant to moisture, and since oxychloride of zinc is the best resistant to bacteria a combination of these two materials would seem to make the best root filling. The gutta percha being placed at the apex of the root canal and over this a filling of oxychloride of zinc. This combination root filling has resisted infection from the crown end for over 60 days. Of course there is the probability of absorption of moisture if there be any from the apical end, but no harm will come of it if bacteria are not carried to it by the circulation.

In conclusion, it is my impression that few if any root canal fillings are resistant to either moisture or bacteria, and that most peridental infections are direct from the oral cavity in pulpless teeth, and if oxychloride of zinc were used in the pulp chamber or some part of the root canal many, if not all, such infections would be averted.

PRESIDENT'S ADDRESS.*

By Hart J. Goslee, D. D. S., Chicago, Ill.

An earnest and just appreciation of the duty devolving upon me, as your presiding officer, of presenting an address at this time, causes me to assume the task with a modest degree of temerity.

Being keenly mindful of the purpose and character of this gathering, I fully realize that I am to address the contingent of the dental profession upon which rests much of the responsibility for our professional advancement through the institution and prosecution of means for raising and supporting its more progressive educational methods; and those to whom, I believe, the profession must now look for the establishment and maintenance of wise and correct fundamental, basic principles of education.

It is this realization, combined with the knowledge that I am expected to follow the custom of my official predecessors in naming and intelligently treating the subjects which most pressingly interest us, and demand our consideration, that makes a task and a pleasant duty appear to me to be somewhat analogous.

My conception of this responsibility so completely overwhelms me that should I be able to even approach a just and rightful performance of the duty I shall certainly outdo my most sanguine expectations.

We meet to-day in a convention which is made auspicious by marking the tenth milestone in our history—our tenth anniversary. While we have but to look backward over our vigorous record, and upon the work we have accomplished, to prove the efficacy and usefulness of our organization, such a retrospective view of that which has been already performed, and of the benefits which have accrued therefrom, only enables us to more clearly grasp, and to more fully appreciate, the fact that at the end of the first decade even a greater and broader field for bettering the work of dental education now lies before us.

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* Read before the Institute of Dental Pedagogics.

It has been the good fortune of this body to enjoy a marvelously rapid growth, and to assume a sphere of usefulness beyond controversy, but the premises which we now occupy by virtue of predestination, perhaps, augmented by health and vigor and energy, should not allow us to become unmindful of the primitive efforts which have made it possible to attain to the achievement of results which have in turn aided so materially in the progress of dental education. These efforts, I believe, warrant me upon this occasion in indulging in a brief reference to our history and progress.

Organized for the purpose of fostering and advancing the methods of teaching the technique pertaining to the art and mechanics of dentistry in our schools, a line of work was inaugurated which was new, which was needful, and which awaited and offered great opportunities for development.

From a small coterie dominated by enthusiasm in their special field of work, and imbued with the belief that ways and means by which an interchange of ideas, and a dissemination of thoughts along the line of the teaching of that class of work which was of a purely technical nature should be permanently established, and would be productive of much general good, we have grown until we now encompass a broader field, and one more scientific and strictly pedagogic in character.

When an organization is born it is not always possible to prophesy the scope of its life's work. In the midst of a primeval forest we have hewn, cleared, builded, added to and embellished until there now stands a structural work of sturdy proportions, and of modern scientific architecture.

Whatever the original thoughts and the primary objects might have been, the tendencies of this organization from the very first have been to enlarge the range of subjects to be considered. While this disposition was for a time questionable in the minds of some, it ultimately became warrantable, and apparently necessary, for the reason that no other body assumed to devote the proper attention to this particular line of work, or seemed so well adapted to such purposes. As a result, our present status is but the natural outgrowth of necessity, and any institution must be a needful acquisition to its immediate community to succeed and advance.

While it is notably true that advancement along the lines of teaching is being constantly made in every department of educational work, this advancement is perhaps more particularly evidenced in dentistry than in any of the arts and sciences; unless it be the science of pedagogy itself, which is still in its infancy.

That the work and influence of this Institute have done much to inspire and promote this degree of development and progress can scarcely be doubted.

During our past meetings we, as teachers, have been getting closer and closer together. We meet as men engaged in the same lines of work. Our interests are mutual. We have no legislation or politics to engross or divert our attention. We know how the various teachers in different schools present and teach their respective subjects, and we are more or less familiar with the advanced ideas of the most successful teachers.

The natural result of such coordination is that a more advanced, progressive and uniform course of instruction is now given in all of the fifty-two recognized dental colleges in the United States and Canada, in view of which, since no other body has been similarly engaged, or could devote their concentrated efforts to such work, it seems quite improbable for this Institute to have infringed upon the territory, or usurped the rights of other organizations.

The development of system in the methods of teaching during the past decade, and the constant improvement which is being made along these lines, all of which are evidenced by the amount of instruction now being given in a course of three terms, as compared with only a few years ago, must be regarded as an eloquent tribute to the work of this body.

When we pause and reflect upon the vast amount of instruction which the well-regulated dental school now succeeds in giving during the prescribed course, and the part which this organization has played in making it possible, and in further developing and promoting it, both the degree of correctness in our principles and purposes, and the scope of our possibilities and usefulness are manifest, in view of which I submit, without fear of just criticism, that the whole range of dental teaching is not too broad to be considered by this body, or to be benefited by its deliberations.

The subject of dental education in the broadest sense, in my opinion, is now by right of privilege and competency the work of this institute. With such interpretation of our function, it would seemingly be quite inadvisable, if not, indeed, impossible, to draw any line of distinction between the teaching of all correlative subjects which must be included in the dental curriculum, and which result in the further development, progress and broadening of our educational requirements.

Because of the indomitable activity pervading the ranks of this body, and the nature of our contributions, which have encompassed a range extending from the purely practical to the highly scientific, thus enabling us to become rich in experience, I believe that in so far as *the prerequisites of teaching* are concerned, this is now the one organization in America perhaps best qualified and most competent to consider *all* questions and problems pertaining to the advancement of dental education, and that an infinite amount of general good must necessarily result from such consideration.

While we have no legislative power—and I trust that we shall never assume to have, for much of the good work which has been accomplished may be attributed directly to this fact—I am of the opinion that it is also within our special province to include and deliberate upon the subject of curriculum.

This is said advisedly, because I entertain the belief that nothing has more to do with modern dental education than a well regulated curriculum, and I am also constrained to affirm that much of the advancement which has resulted, directly or indirectly, from the efforts of this body, or which shall so result in the future, may be attributed to the systematizing and unifying of the curriculum, as well as to the development and elaboration of teaching methods.

However much progress has been made in recent years in the systematic presentation of principles, the teaching of dentistry has not yet quite crystallized into permanent form, and the work incident to such crystallization, and to properly placing these principles in the curriculum, may yet require some time, and is just now of infinite and paramount importance.

In all branches of general scholastic training, there is a universal lack of unity, and while a more or less uniform dental curriculum would doubtless be eminently desirable, the individual conditions and environments are such that any effort to establish the same would probably prove futile. It may not even be possible, or to the best interests of the individual schools, yet, at the present time, there is such a wide diversity that the condition is almost deplorable, and there can be no doubt but that a far greater degree of uniformity would be of inestimable advantage to all colleges, and to the progress of dental education.

As to what should be the possible scope of an adequate and suitable curriculum, I could make no better or broader recommendation on this, the very eve of the adoption of the four-year course, than to quote from the splendid address of my immediate predecessor, Dr. George E. Hunt: "The dental college curriculum should be such that a degree of Doctor of Dental Surgery will carry with it a breadth of knowledge, and a wealth of attainment, that would put its possessor on a plane with those who have taken the degree of Doctor of Medicine."

That this is a laudable and reasonably logical recommendation must be admitted, and that it is without doubt the desire and effort of the representative colleges and teachers to so qualify their graduates is evidenced by the increased course of preparation and study now required by all reputable dental schools.

In view of the marked development and advancement in this connection, there is seemingly but one essential prerequisite to such a sequence, and this is that the preliminary requirements for admission into all dental schools must first be placed upon a more or less uniform standard similar to that governing admission into the leading medical schools. In this connection, I believe that an educational qualification for admission into our schools should be equivalent to that for the admission of students into all high-class institutions of professional learning.

This, however, is the work of our legislative bodies, and is now being more or less diligently prosecuted, to the end that when this shall have reached an equivalent standard, it is safe to prophesy that graduates of dentistry will be received and recognized on the same plane with those from the school of medicine. Moreover, they will be sufficiently well qualified to justly merit and sustain such recognition.

Indeed, even at the present time, with much work, and an ever-growing opportunity for improvement still before us, as an evidence of our progress and as a result of the increased requirements incident to pursuing the study of dentistry, of the development and systematizing of our methods of teaching, and of the broadening of our curriculum to its present scope, I feel sufficiently well informed by observation and comparison to agree with the statement recently made by Dr. Truman W. Brophy, in his address to the Commission on Education, International Dental Federation, at Stockholm, Sweden, to the effect, "that the average dental student in the representative dental colleges of America today has to cover a broader field of preparatory work than the average medical student under similar environments, and that the average graduate of such a dental college is, on the whole, better qualified to undertake the responsibilities incumbent upon the practice of his profession, than is the average graduate of such a medical college."

This statement may possibly seem somewhat dogmatic, but if we contemplate the full preparatory course of the dental student, and that the most successful and proficient practitioners are those who early adopt, and confine their efforts to, a particular line of work or specialty; that the study of dentistry is infinitely the study of a specialty, while that of medicine is of necessity more general, I believe that a surprising degree of truthfulness and correctness will be revealed. Because of the high degree of manipulative skill, and of the knowledge of the intricacies and technology of art and mechanics demanded by the specialty of dentistry, I regard it as entitled to rank next in importance to the specialty of *general surgery,* which is the manipulative and mechanical department of medicine.

The efforts of this organization stand out conspicuously among those of others in the development of conditions which thus place the specialty of dentistry on a higher plane, and tincture such utterances with reason and logic. Dentistry has assumed the dignity of a profession, and the practitioner that of a professional man, simply because of the tendency toward higher educational requirements. Even in the most humble community, a professional man is accorded a certain degree of respect, not because of his personality, or of his efforts to exemplify the modern Beau Brummel, but solely for the reason that the title carries with it a certain assurance of the pursuit of learning and the acquirement of knowledge which is somewhat beyond the strata of commercial pursuits.

But, as a body, we can yet do more. If we are to contend for regard as embracing relationship and equality with higher medical science, we must further extend our curriculum to include all necessary and useful correlative subjects.

Incident to the installation of the four-year course, I regard nothing of such momentous importance as the consideration of the various changes in, and additions to, the curriculum, which must necessarily be made to broaden the course and cover the extended time to the very best advantage. And, while not unmindful of the preceding excellent recommendations in this connection, and of the appointment of a special committee which is expected to report at this meeting, I am, nevertheless, constrained to briefly indulge in a few recommendations on my own account.

Among other advanced ideas, our profession has come to regard with interest the importance of the subject of physical diagnosis. Some colleges have already added this line of study to their curriculum, and others are putting forth some effort to establish it in theirs.

This effort is most heartily commended. I believe that the dentist's province of labor demands a knowledge of the varied physical conditions constantly met in practice, notwithstanding the somewhat cynical opinions occasionally expressed by more or less narrow-minded members of the medical profession to the contrary.

It has been intimated that the only occasion for knowledge in physical diagnosis on the part of the practitioner of dentistry is in connection with anesthesia, and while we might concede that this connection is the most important one, yet I deny most emphatically that it constitutes the entire scope of desirability and requirement for knowledge of the physical conditions presenting.

Knowing that there is a relationship existing between the dental organs and the general physical condition, even though this relationship is largely of an indirect nature, should we ignore the study of the manifestations of these conditions?

I believe this study should be pursued with as much interest and energy by the student of dentistry as by the student of medicine. I entertain this opinion, not only because of the importance to the dentist of knowledge of this science, but because I cannot countenance restriction of dissemination of knowledge to the dental student which will even indirectly aid him in better fulfilling the purposes of his calling, or which shall detract from his standing before the community as an equal in scientific aspirations and attainments of the student of medicine, or of any other science or profession.

A dental course in this subject to be sufficiently broad should embrace didactic instruction in the normal location of the thoracic and abdominal organs; the location of pathological conditions, and the diseases which may cause them; the effects produced by these pathological conditions upon the general system, and how such may indirectly cause diseases of the teeth and mouth; the care of the teeth during, and precautions incident to pregnancy; the care of the teeth and mouth in syphilitic conditions; the deformities of the teeth and mouth which may result from naso-pharyngeal conditions; the indications for general anesthesia, and the precautions and dangers incident to its use.

This didactic work should then be supplemented by a practical course, consisting in the examination of the normal and abnormal chest; the diagnosis of pathological conditions of same; and the examination of the heart, lungs, kidneys and liver, together with the effects produced upon these organs by the administration of ether, chloroform, nitrous-oxide and cocaine, or therapeutic agents of any nature which might have a pathological influence upon them, bearing upon anesthetic administration. All of these considerations from a general point of view are important, and from a dental view-point are essential to a broad education.

I also heartily endorse the previous recommendations for a thorough and well-rounded course, from a dental view-point, in biology, bacteriology and applied physics, the importance of each of which demands for them a more or less conspicuous place in the curriculum, as a means of further broadening the desired preparation and qualification of the student.

A course in pathological laboratory work would also be a valuable addition. The student would thus be enabled to examine into the varied pathological conditions constantly met in the infirmary, and be the better prepared to successfully treat such conditions because of the possession of knowledge of means for facilitating the accuracy of scientific diagnosis.

A practical laboratory course in pharmacy, materia medica and therapeutics is also recommended, and without doubt would prove of inestimable value.

I would suggest that such a course be divided into separate classification, as designated, and that each should embrace the following:

Pharmacy. First: Metrology. Weights and measures; the metric system; specific gravity, and use of apparatus for determining same of both solids and liquids; specific volume; parts by weight; percentage volume and weight; percentage solutions.

While this is, of course, almost exclusively *physics,* its direct bearing upon the completeness of such a course warrants its place in this classification, and a more advanced didactic and laboratory course in applied physics, to include fundamental instruction in the possibilities of electricity, photography, radiography, etc., would also be useful and eminently desirable, and without which the curriculum of any dental school will be incomplete.

Second: *Pharmaceutical Preparations.* All such preparations need not, of course, be considered, the selection being confined only to those *classes* which are, or should be, used in dentistry, e. g.,

a. *Solutions.* Those solutions, under which general class belong such preparations as waters, solution, spirits, syrups, elixirs, glycerites, collodion, etc.

b. *Products by Extraction.* Wines, vinegars, tinctures, fluid extracts, extracts, etc.

c. *Mixtures.* Liniments, etc.

d. *Mixtures of Solids.* Powders, etc.

e. *Preparations for External Use.* Ointments, plasters, etc.

Third: *Prescription Writing.* Under this head should be considered (a) language and abbreviation; (b) the signs and terms; (c) incompatibility, etc.

Fourth: *Compounding.* In this work prescriptions should be written calling for both official and unofficial preparations, such as ointments, powders, plasters, percentage solutions, etc.

Such prescriptions should be *corrected* and *filled,* thus imparting to the student a knowledge of the art of mixing ingredients as well as of prescribing.

Materia Medica. The work of materia medica should consist in the study of *crude drugs,* with an examination of the *characteristic* of the drug as it appears in commerce; the official *title* in Latin and English; the *origin,* whether botanical, animal or mineral; their constituents, properties, dose, and the various pharmaceutical preparations into which they enter.

Therapeutics. This work would best be devoted, perhaps, to demonstrations and experiments upon the lower animals, as such is the only effective means of treating practical toxicology. The action of such poisons as arsenic, morphine, cocaine, strychnine, etc., may be observed, and the antidotes for each, and how they may be best administered, can be considered.

Special attention may be also directed to the application of each drug, so studied, to the various pathological conditions of the human system.

A course in *Laboratory Physiology* would also prove a valuable addition to the dental curriculum, and the following suggestions may serve to illustrate the possibilities and practicability of such a course:

I. Electrical Batteries: Elements, conductors, keys, commutators, rheostat, rheocord, etc., and the teaching of the uses of the various apparatus employed in muscle and nerve stimulation.

II. Muscle-nerve Preparation: Stimulation and records; the laws of construction, work done, etc.

III. Circulation: Frog's foot: The laws of flowing liquids; force-pump; pressure; schemes for artificial circulation; pulse sphygmograph; vagus effect, etc.

IV. Respiratory Measurements: Pressure; lung capacity; laws of gases; respiration of various gases; nerve stimulation of respiratory apparatus, etc.

V. Ferments: Action on carbohydrates, proteids and fats; characteristics of foods; laws of absorption; diffusibility, etc.

VI. Blood: Counting corpuscles, hemoglobin determination; hematocrite; bone marrow; blood clotting, etc.

VII. Physiological action of the more common drugs on tissues in which the local effects on flesh, etc., and the constitutional effects on live animals may be observed.

This course may be made supplementary to the former, and each will be benefited by and advantageous to the other.

Getting down to the more practical subjects (so-called), I also earnestly recommend the addition of a thorough *laboratory course* in *dental metallurgy,* based somewhat along the lines recently suggested by Dr. Hodgen, and deprecate the fact that so little attention is given to this important work by so many schools.

The course must necessarily follow a didactic course, and the first work in the laboratory should be to familiarize the student with the various apparatus, appliances and fluxes used in the fusing and alloying of metals.

This should be then followed by a study of the metals, their characteristics and physical properties, and those should be selected for the first experimental work which best illustrate these general properties; and those properties of malleability, ductility, tenacity, conductivity, specific gravity, fusing point, electro-positive character, etc., should be carefully noted.

The experimental study of the individual metals should be followed by mixing them in the preparation of alloys, and *all of the various alloys used in dentistry should be prepared by the class.* In this work the student becomes acquainted with the properties of alloys by discovery. He notes the influence certain metals have on the alloy, and the difficulty of adding low fusing and easily oxidizable metals to higher fusing ones, which is especially important in making solders and dental amalgam alloys, all of which knowledge is so materially essential to their proper and skillful manipulation.

In view of the rapidly increasing importance of the ceramic art in its application to dentistry, I also most urgently advocate a course in advanced operative technics, to embrace the various phases of porcelain work.

Such a course should consist in the study of the composition and characteristics of porcelain "bodies;" their preparation, coloring, shading, manipulation and fusion, and the preparation of cavities and adaptation of inlays by the various methods. In this connection I am pleased to endorse and call your attention to a simple method of presenting this subject which has been devised by Mr. Robt. Brewster, of Chicago, and which upon request will be further elucidated during this meeting.

Granting that all of these, and perhaps many other additions of equal importance, must be accommodated and properly arranged in the four-year curriculum, I believe that after the first year shall have adjusted itself, we will wonder how we succeeded as well as we did without them, and in less time.

I also believe that the amount of time spent upon the teaching of all subjects, and their proper place in the curriculum, can and should be settled by this body; and that if any degree of uniformity is to be obtained, our efforts will be productive of much good. In this connection, however, irrespective of individual exigencies or conditions, the arrangement must be made on a "broad, sound and logical basis, and not for the convenience of any school or teacher."

In the arrangement, it must be remembered that we expect and exact much of the student, much that is unnatural and difficult, for many; for but a limited proportion are capable of grasping and comprehending the more scientific elements, and assimilating with them those of the more mechanical and technical order.

The first efforts, then, should be directed toward the development of an interest in the work, a recognition of the requirements, and an appreciation of the possibilities. It has been said that in the development of handicraft of an artistic nature, we must first cultivate the sight, as the eye must see in order that the mind may comprehend, and the mind must comprehend before the fingers can execute.

When this stage of development has been reached by an adequately adapted primary course in manual training, such as has been already recommended, and accepted as invaluable, the student is then prepared to more fully appreciate the advantages of technique, which, of course, has for its basic object the development of familiarity with the fundamental principles, and with the nature and characteristics of the materials employed.

For this reason, if the arrangement be based upon a scientific, progressive system, I am of the opinion that prosthetic technics should begin with and extend through the first year, and that the only part of operative technics given during this period should be a thorough groundwork in dental anatomy; and the present system of carving is regarded as the best means of impressing the latter subject.

As a further evidence of the logic of this recommendation, I will quote a statement made several years ago by Dr. N. S. Hoff, with which I am in perfect accord: "One of the strongest reasons for making the prosthetic course the primary and fundamental one is because of its being so versatile—some of the operations being so simple and others so intricate that it is admirably adapted to the purpose of developing skill in handicraft." For this reason, the student who has pursued this course first, and has also received instruction in dental anatomy, is thus better qualified to take up operative technics at the beginning of the Sophomore year, which, in my opinion, is where it properly belongs, and should be placed.

In conclusion, gentlemen, permit me to take occasion to express assurances of my deep sense of appreciation of the honor you have conferred upon me, which thus permits me to inflict myself upon you in this humble plea for increased and broader educational and professional requirements, and to thank all of the officers for their loyal support, and you for your attention.

THE PRACTICE OF DENTISTRY.*

BY CHARLES A. VAN DUZEE, D.D.S., ST. PAUL, MINN.

A glance backward over the history of our chosen calling serves but to emphasize the fact that its origin is within the span of a few years, that it is of humble birth, and that its development is coincident with advancing civilization.

The efforts of the pioneers in dentistry were confined exclusively to an attempt to remove the offending member or to disguise the results of disfiguring decay, with little hope of arresting the disease.

With the increasing prevalence of caries, the ranks of oral surgeons were extended, and slowly but surely the materials with which to work and the methods for their use became better known, despite the attempt, during the first years of their employment, to prevent by every means the spread of this knowledge from one practitioner to another. It is only within the last generation that there has been a general inclination to spread broadcast the knowledge which has accumulated; and with this opening of the flood gates the progress of our profession has gained an impetus which promises stupendous results within the near future.

From a beginning which may be fittingly illustrated by the response of a dentist of some fifty years ago, who, when requested to stop shoeing a horse and attend to a molar, replied, "Plug or pull?" down to the opening of this century, the field has been rapidly broadening until it is beyond the skill or learning of any one man to fully master its entire compass.

The various filling materials and their manipulation, the bases and superstructure in prosthesis, the art of crown- and bridge-work, the manipulation and application of porcelain, the treatment of local diseases and the correction of irregularities, with their various requirements, have occupied all the energies and have exhausted the resources of those men who have toiled for the upbuilding of our profession. The progress and accomplishments of these earnest men, surrounded by so many discouraging factors, have been wonderful, and it is yet too soon for history to accord the full measure of gratitude which is due to those who have accomplished so much for suffering humanity.

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*Read before the G. V. Black Dental Club, Nov. 21, 1902.

From this small point in the modern history of the growth of science, with most incredible swiftness the profession of dentistry has expanded and developed until the people of every country are in a large measure familiar with the evidence of its growth, and the education of these people has reluctantly followed in its pathway, It is not strange that this stream of knowledge and the progress of our attainments have followed along certain well defined lines, nor can it be said that the flow of this current has been circumscribed; yet it is true today that by far the larger portion of all that has been done has been directed toward the accomplishment of those two simple desires that prompted the first efforts of the pioneers—to remove the offending member or to disguise the results of disease. The principal reason for this lies in the fact that all of progress and investigation has been required as a labor of love from those who have striven to accomplish these things.

The State has not fostered the progress of dentistry, and it is not uncommon for the very people in whose interests this work has been carried on to belittle and undervalue the results; but in spite of lack of support, and of discouragement of every kind, we are today advancing upon the crest of a wave of magnificent proportions, and one whose ultimate destination we can but vaguely estimate. It is at this time, and during the life of the present members of this club, that a realizing sense of the mistake which has been made in the growth of our profession should come to us. Those who have gone before have accomplished much, but to those who come after must fall the burden of developing a new line of attack.

It should be the office of the dentist to not only cure the disease in our particular field, but to devise ways and means for the prevention of that which has for years occupied our professional ancestors almost exclusively.

You would deride a man who devoted his energy to bailing out the water in his ship rather than to stopping the leak, and yet we go on day after day and year after year devoting the larger portion of our energy to filling cavities of decay, to scaling deposits from the teeth, to correcting irregularities of position, and to the discussion of the merits of various materials and methods. These things were necessary in the early life of our calling. They are necessary today; but they are not the objective toward which this profession of ours is progressing. It has been said that the surface of a tooth constantly swept clean would not decay. While this is true, perhaps, it is not the whole truth, and it is therefore misleading. It carries with it the assurance to the laity that they must only approach perfection of cleanliness to avoid decay. This is a good line of defense for our fellowmen to occupy, but it is not all. Man must sleep, and we know of no available antiseptic or germicide which will protect us during these hours of sleep; nor in my opinion should we devote very much energy to search for such a solution.

Nature has provided each human being with all that is necessary, and that its office is not fulfilled is simply because we do not avail ourselves of it. The saliva will accomplish all that is desired, if reasonable cleanliness is maintained, and ofttimes in spite of its neglect, provided the saliva is normal in reaction and quantity. If it is granted as a basic principle that the one thing necessary to the avoidance of all the ills that lie within the field of our vision is a normal supply of normal saliva, we shall have taken a long step toward the solution of our problem.

In the practice of medicine within the last few years a theory of attack upon disease has gained considerable ground, which aims to so foster and support the integrity of those cells whose office it is to protect the human economy from "invasion," and, by augmenting their power, to thus make it impossible for disease to gain a foothold or persist in its ravages if accidentally acquired. This theory is promulgated under the title of Organotherapy, and since 1892 it has received great consideration by the most eminent German authorities. Dr. Freund of Berlin writes very interestingly upon this subject, and, among other things, says, "The vital energy of the cells alone prevents infection. Nature augments this energy. In this Nature should be encouraged." I would parallel this statement by one pertaining to dentistry. Saliva alone prevents infection. Robust, vigorous function augments this energy. In this Nature should be encouraged. I would direct your attention to the recent work by Dr. Michaels, on

"Sialo Semeiology," in which the claim is made that the saliva furnishes a more accurate medium for the diagnostician than the urine, which indicates that impairment of bodily function is more clearly expressed in the saliva than in the other fluids excreted from the body. If the integrity of the saliva is the prime factor in the inhibition, not only of caries, but of all other diseases of the oral cavity, and if this power can be augmented, why is it not true that the first requisite in the practice of dentistry should be a perfection of our understanding of the body functions, and a mastery of the rational way in which to encourage nature, that she may furnish an abundant and normal supply of this necessary antiseptic and germicidal fluid, which can alone reach the source of all dental evils? Let us consider in detail a few of the diseases which require our attention.

We have the so-called pyorrhoea, which Talbot tells us is present under another name in some stage or degree in over 90 per cent of the human family. A brief statement as to its *etiology* might be as follows:

The hastening of a physiological process more or less complicated with pathological conditions, by local irritation. The ravages of this disease are inhibited or augmented by the condition of the patient. In exactly the ratio between vigorous vital power, and bodily weakness, do we find our efforts successful or futile. What does it avail us if the most painstaking attempt is made to remove all sources of the local irritation? We are simply practicing the two rudiments of our calling.

A broad grasp of our responsibilities demands something more.

In orthodontia a large proportion of the evil results can be traced directly to neglect of the deciduous teeth, with that familiar train of faults, improper nutrition to the infant, lack of knowledge on the part of the parents, and neglect by the family dentist, both in the line of instruction to the parents and in a masterful command of the whole situation. In other words, the prevention of irregularities of the teeth, and not to the correction of the evil, should be our goal.

Crowns and bridge work are only further illustrations of the magnificent results of perfection in detail and skillful attainments, in an attempt to disguise the ravages of diseases.

If a fraction of the energy which has been expended in the perfection of methods for building and attaching crowns and bridges had been expended in the true solution of the causes and prevention of the disease which called for their application, the profession of dentistry would occupy a much more exalted position, and the demands for their employment in dentistry would have largely decreased.

The same principles which have been expressed with reference to these three branches of our work are applicable in a discussion of any of the various conditions which we as dentists are called upon to consider. The time is at hand when the public, whose servants we are, is enlightened to a point where such service as has been acceptable in the past will no longer be approved.

The future of our profession depends largely upon a correct understanding of our responsibilities and a clear conception of our ultimate destination. There are two forces in operation, which are exactly opposite, in the results which will be produced upon our future. One is the elaboration of the methods and skill which would eventually place our profession upon a high plane as a mechanical calling, and the other is the more scientific education which a few noble and unselfish men are fighting for against almost hopeless conditions.

Today these conditions are not as hopeless as they were ten years ago; yet, with this improvement in the situation, our responsibility has increased.

It is true that the first of these two forces is an essential factor and in all probability will always remain so, but the professional side of dentistry offers the only channel through which we can hope to reach our legitimate destination.

It is easy to criticise existing conditions, yet it is only through just criticism that we may hope for improvement.

There are two radical methods which are at once available, and through which everything that is desirable may be accomplished.

They call for much of sacrifice upon the part of the members of our profession, not alone in the way of financial and moral support, but in that we must depart from our present ideas of propriety and accept new views for our future guidance. As I have said, the field of dentistry has broadened to such a degree that it is no longer possible for the knowledge and skill of one man to encompass the whole. If you accept this as true, it is then clear that we must divide the field in order to successfully accomplish the work that must be done. The years of conscientious labor which are necessary to develop an acceptable degree of skill in the mechanical branch of the work demand all the time and thought of an individual, and preclude the possibility of developing the highest degree of skill as an operator and at the same time reaching even a possible degree of attainment as a scientific student.

It seems clear, therefore, that we must devise and perfect a system under which that part of the work which is purely of a mechanical nature shall be left to men whose entire energies are directed toward perfection in that line.

It would naturally follow that the man of mechanical tastes and aptitude would be able to attain a higher degree of perfection in this way than if compelled, as at present, to develop also an acceptable proficiency along purely scientific lines.

Upon the other hand, if it were possible to practice dentistry without the drudgery of the daily toil at the chair or in the dental laboratory, the surplus energy of the individual would be available for the solution of the scientfic problems which confront us upon every hand, and it would also follow that men of natural ability and tendencies along scientific lines would choose this other branch of dentistry, and, being unfettered by the additional requirements of the operative field, would be enabled to attain to a much higher degree of proficiency than at present.

Eventually the mechanical field must be again divided, and we would have specialists in purely operative dentistry—Prosthetists, Orthodontists and Oral Surgeons.

The scientific field would develop specialists of Sialo Semeiology, Interstitial Gingivitis, Neurasthenia, Anesthetics, etc., and would furnish from its ranks the men who must go into the scientific laboratories and master the deep questions upon which the future of the whole must rest.

The education of the people must be attended to and the wheels of government so directed that this matter which is of vital importance to the future welfare and comfort of the human family may be fostered and receive the financial support which is absolutely necessary.

It should not be necessary for us to send specimens of saliva or sections of suspicious growths to an histologist of the medical fraternity for examination nor to call upon a physician to administer anesthetics, with all that is implied in a scientific exhibition of these agents, nor to perform any of the surgical operations which are clearly within our province. We should be entitled to labor for the welfare of mankind on terms of equality; and in order that this much-to-be-desired condition may be brought about it is necessary that we go before their societies well qualified to fight our own battles, and demand of them recognition and co-operation.

In this city recently a dentist in good standing held a patient under observation for four months and occasionally lanced and excited to added activity a malignant growth whose origin was in the antrum, and by his ignorance and fear of exposure, allowed the patient to drift into a condition when death must come quickly. The disaster to this patient is only greater than the loss to us of professional standing which must come by such a display of ignorance or willful disregard of the first precepts of diagnosis.

The gentlemen here today represent an association banded together in the name of one who stands before the world head and shoulders above his fellows, in the cause of uplifting this profession, in fitting emulation of this man who has accomplished so much, and who has sacrificed so much for it. You may not all agree with the statements I have made before these last ones. I should prefer that you would not, unless by careful consideration and discussion it should prove that they are true, for they are of momentous importance.

It is not necessary that we settle beyond dispute the details of the plan, but it is necessary, and of the utmost importance, that we go upon record for the advancement, along general lines, of this project. We have devoted much energy to advocating certain methods of procedure and collateral subjects. This work is well in hand and the seed will spread and grow and bear fruit. Why can we not enter now actively into this other field, without letting up in any degree upon the rest? We have at least one man among us with enough surplus energy and generosity to struggle along, paying his own expenses, and giving of his valuable time, that we and the world may benefit thereby.

Is it not possible that we, with the aid of the people we know, may organize and put in motion a plan, by which a suitable laboratory may be established in this city, in which men who are interested may take up the work under the supervision of this body, and from time to time may we not enlarge the scope of this work?

What would be the effect upon our profession, if, within the near future, a similar project were established in every city of our size in the country? What will be the effect if we do not take the initiative? If by good fortune someone anticipates us in this action we shall have lost the opportunity of our lives.

The Northwest stands shoulder to shoulder with the Middle West, and somewhere between them lies the crest of the wave which marks the progress of dentistry. Is not this the fitting source from which would spring the tide that eventually will turn the current of our progress from the two original motives of dentistry (the removal of the offending member, or the disguising of the effects of disease), into the broad path of intelligent, practical, scientific knowledge of the causes which are alone responsible for the diseases we are battling with, and then the mastery of their control.

THE USE OF NON-COHESIVE GOLD.*

By G. W. Haskins, D. D. S., Chicago, Ill.

I do not expect to present to you any new idea upon the subject before us, as the ground has been gone over so many times in the past; but I do hope, by giving the old facts in perhaps new language and by the discussion which I trust will follow, to encourage some to use non-cohesive gold who do not do so now, for of its value as a saver of teeth, a saver of time and of dentists I am firmly convinced. Early in my practice I revolted at the tremendous energy required to fill the gingival third or half of proximal cavities in bicuspids and molars with cohesive gold, at the same time realizing how uncertain such an operation was liable to be and in many cases how impossible. The spreading properties of non-cohesive gold appealed to me, and I commenced to use it with increasing satisfaction as I became familiar with it, each year using it more and more.

I shall not attempt in this paper to speak of the use of non-cohesive gold as a filling material when the entire filling is to be made of it, as I do not use it often in that way. I do use from one to four or more sheets in all proximal and occlusal cavities in bicuspids and molars, and it is of its use in this manner I will speak tonight.

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*Read before the Chicago Dental Society, Dec. 2, 1902.

It is natural to consider the subject under three headings: The preparation of the cavity, the preparation of the gold, and the technique of the operation.

Proximal cavities in bicuspids and molars are prepared with a step in the occlusal surface, with broad base at the gingival portion and extending lingually and bucally for the prevention of future decay. The lingual and buccal walls of the cavity need not be at right angles to the axial wall, but the gingival wall should be, and should have a decided retention groove cut in it, which grooving should extend up the lingual and buccal walls, but should be of slight depth and cease entirely before passing the occlusal third of the cavity wall. The step in the occlusal portion of the tooth should have a very positive retentive shape and of such depth that the dislodging strain of mastication will come upon the dentine and not upon the enamel. The axial wall should have no irregularities upon its surface, but be made flat with a wide chisel so the cylinder of gold will have nothing to interfere with its passing readily to place. The enamel margins should be beveled.

In occlusal cavities the walls should be parallel with the long axis of the tooth, with slight retention grooves and the enamel margins beveled. The inverted cone bur is a useful instrument for such cavities and gives all the retentive shape needed, in addition leaving the cavity with a flat pulpal wall at the bottom.

The gold should be a positively non-cohesive foil; otherwise, all values to be gained by its use are lost. I find use for but two forms of gold foil—absolutely non-cohesive and the most cohesive I can find. For many years I used Abbey's No. 4, and have since used Williams' No. 3 non-cohesive foil. The amount of gold in each sheet of the latter seems more frequently to be just the quantity needed than is the case with the No. 4. Never use less than half a sheet at a time, and from that up to from two to three sheets, according to the size of the cavity; the gold is first folded carefully into a ribbon, being sure to bring the folded edges evenly together. In proximal cavities the width should be as near the mesio-distal depth of the cavity as can be, having it a trifle wider rather than the least bit too narrow. For occlusal cavities the ribbon should be one-half wider than the depth of the cavity, to allow for surface condensation. The ribbon can then be rolled upon a broach into a cylinder, or with the pliers folded into an ellipse or cushion whose major axis is in length twice the width of the cavity. The ellipse is better than the cylinder in some cases, for the reason that it has not the dense center of the latter.

In filling proximal cavities in bicuspids or molars where the interproximal space is sufficiently wide for sanitary purposes, it is not necessary to use the separator to gain additional space before operating. After preparing the cavity, a thin steel matrix is adjusted to fit perfectly to the tooth; at the gingival margin of the cavity it is pressed firmly to the tooth by an orange wood wedge made thickest on the side nearest to the gum, which allows the matrix further crownwise to come in contact with the adjacent tooth and permits the contouring of the filling. It is not necessary to allow any space between the tooth and the matrix in order to make a perfect filling at the gingival margin of the cavity. I have as much reason to believe we can fill the angle which the gingival wall makes with the matrix as that we can fill the angle made by the gingival wall and the axial wall; and it is essential that the matrix be as near immovable as we can make it, for the tendency of the gold is to spread under the pressure of the plugger, and it will go in the direction of the least resistance. If the matrix gives, it will go in that direction; if the matrix is immovable, it cannot get away and is consequently forced against the cavity walls. It is this tendency to "get away" that gives non-cohesive gold its great value in such cavities as we are considering. If it is confined in five directions, and pressure is applied from the sixth, the leaves will slip and slide upon each other as long as there is space to occupy, and then it stops. Some recent experiments by a man skilled in its use shows it possible to condense it to such a degree that it lacks but 34-100 of 1 per cent of the density of cast gold.

In filling a proximal cavity in bicuspid or molar, it is of great importance that the layers of gold should extend from the axial wall of the cavity to the proximal surface of the filling, and to effect this end the ribbon of gold should be carefully folded and rolled. If a trifle too long after rolling, it may be shortened so that it will slip into the cavity easily and without change of shape or danger of tearing the leaves of gold.

Taking a proximal cavity in a bicuspid for example, with matrix adjusted and firmly fixed, after the cylinder is introduced and carried to the gingival wall, it is then forced to place with hand pressure, using a large square plugger point, care being exercised to press it well into the gingivo-lingual and gingivo-buccal angles of the cavity. Condensation is then effected by a smaller foot plugger and the mallet. The serrated end of this plugger should be at nearly right angles to the long axis of the instrument, and in other respects of such shape and angle that when applied to the empty cavity it would come into contact with all parts of the gingival wall. Another foot plugger is needed which has not the usual rounded toe, but is brought to a point, thus enabling one to condense the gold in the angle made by the matrix and the lingual or buccal wall. Condensation should be continued until there is no further movement of the gold, and then a little longer, keeping the surface of the gold a flat plane at right angles to the matrix.

If the gingival and middle thirds of the cavity are now filled, cohesive gold can be used for the remainder of the filling; if not, another cylinder of non-cohesive gold should be used as was the first, and well condensed. Do not be timid as to the amount of gold to be used at one time; it is a mistake to use too small a cylinder. In some shapes of cavities it is necessary to hold the cylinder of gold with a plugger in the left hand until condensation is partly effected, but usually this is not needed.

In mesial cavities in the lower jaw much more care must be exercised than in distal cavities, to know that the gold has been forced to and is well condensed against the gingival, lingual and buccal walls and corresponding margins. The matrix is sometimes in the way of the plugger and hides these surfaces from view. If in doubt, the matrix can be released and after examination tightened again. A little experience, however, makes this unnecessary.

Two methods may be used in starting the cohesive portion of the filling; in case the cavity is a broad one, after using a cylinder of one sheet of gold, a cylinder of a half sheet is placed against the lingual wall and pressed to place by hand; another against the buccal wall is similarly treated. This should leave a depression between them, and in this is placed a large pellet of cohesive gold. The whole surface is then condensed by hand and mallet pressure. The cylinders and pellet overlap each other and leave a cohesive center, from which, without further manipulation, the rest of the filling can be built.

In a narrower cavity, with small pellet and a small, straight plugger no difficulty will be experienced in starting the cohesive portion of the filling in the recess formed by the axial wall, the condensed non-cohesive portion of the filling and the lingual wall.

The continual condensation of the gold against the matrix wedges the teeth apart so much that at the end of the operation some little difficulty may be experienced in removing the matrix; but the flat pliers such as are used in the laboratory will effect this, and then with the separator applied the filling is polished, and if care is exercised not to remove the gold at the contact point, when finished the filling will be fully contoured and in firm contact with the adjacent tooth.

With the matrix well adapted and immovable during the filling, and the non-cohesive portion of the gold well condensed, very little finishing will be required upon the proximal surface of the filling, the joint between filling and tooth will be perfect and there will be a feeling of certainty about the security of the non-cohesive portion of the filling. If, however, the matrix has not been firmly fixed, and the cylinder of gold has slipped endwise out of the cavity under the malleting, there will be much more finishing to be done with no better adaptation of the gold to the cavity and a feeling of uncertainty about its security. Some of the layers of gold will reach only a slight way into the cavity and in time will work out.

The cushion made of one or more sheets of gold may be used to advantage rather than the cylinder in large open cavities, more particularly in the molars. The ends of the cushion are doubled together and the folded portion is introduced in the cavity. The folded ends are then separated and the ellipse will be found to cover the gingival wall and pass well up on the lingual and buccal walls. In the space made by the separated ends a large pellet of cohesive gold is placed, and then the whole mass is condensed together, after which a cylinder is placed in the bucco-gingival angle and carried to place against that wall, followed by a large pellet of cohesive gold, which coheres to the center of the filling and overlaps the cylinder of non-cohesive and, when malleted to place, fixes the latter. The same process is repeated on the lingual wall and continued in this manner until the cavity is two-thirds or more filled. This leaves the filling with a thick mat of non-cohesive gold against the walls of the cavity, and a keystone of cohesive gold in the center, giving greater security against displacement of the filling in a very broad cavity than were non-cohesive gold alone used. In large cavities the necessity of keeping the surface of the gold as it is condensed at right angles to matrix and axial wall is of great importance.

In occlusal cavities the operation is somewhat more simple than in proximal. Taking the crucial form of cavity made in the lower molar as an example, a cylinder of gold prepared as described for occlusal cavities is placed in the distal arm of the cross and with broad, straight plugger or foot plugger is condensed to its limit. If there is any tendency of the cylinder to lift out of the cavity it can be held down by a broad foot plugger pressing down upon it during the first of the condensation. The lingual and buccal arms of the cross are in turn filled, each with one cylinder of gold. Care should be exercised to so manipulate the gold that the condensed portion of the cylinder shall be at right angles with the floor of the cavity. The mesial arm is then filled with one roll, and with heavy hand pressure is condensed in the direction of the mesial surface of the tooth. If the instrument is grasped by the whole hand as a dagger would be held, or with four fingers, and the thumb resting against the teeth, proper condensation can be effected. This leaves the center of the cavity open and it may be filled with large pellets of cohesive gold or with one large cylinder of non-cohesive gold. No surface condensation of the non-cohesive portion of the filling has been attempted up to this point. The cylinders being long, they should stand well above the surface of the tooth and should now be thoroughly condensed endwise with mallet force and rather large points. If the cylinders of gold have been properly manipulated, each separate layer of gold will extend from the top to the bottom of the cavity. The filling will take a beautiful polish and retain it almost as well as one made of cohesive gold throughout; and what is of more importance, there is perfect adaptation of the gold to the cavity walls.

The method of operating in occlusal cavities in the upper teeth does not differ from that just described.

In labial and buccal cavities in all the teeth but the second and third molars, no advantage is gained in using non-cohesive gold, inasmuch as these cavities are easily accessible and cohesive gold can be driven against each of the four walls of the cavity. The shallowness of these cavities compared to their circumference is an element of insecurity when non-cohesive gold is used. In buccal cavities in the second and third molars it is sometimes of great advantage to use non-cohesive in conjunction with cohesive gold. The technique does not differ materially from that already given, using caution to avoid the use of too small cylinders.

In large proximal cavities in the cuspid teeth, where a step is used, a narrow matrix may be used and non-cohesive gold inserted in the gingival third, following the same methods as if it were a bicuspid, the balance of the filling being of cohesive gold.

In proximal cavities in the incisors cohesive gold can be used to much better advantage than non-cohesive gold.

MATRICES.—THEIR CONSTRUCTION, APPLICATION AND WHERE INDICATED.*

By G. W. Dittmar D. D. S., Chicago, Ill.

In this advanced age of invention and art it is, indeed, a difficult task to produce anything truly original, and I would hesitate to ask your kind indulgence in listening to what I have to say were it not that I am impressed with the importance of this subject.

I am fully aware that little, if any, of what I shall say will be really new—but being cognizant of the fact that there are too many practitioners of dentistry who either abuse the use of, or else are ignorant of the positive benefits derived from a properly constructed and well adjusted matrix, especially in the insertion of plastic fillings, I present this paper.

The first published account of the use of a matrix as an aid in inserting a filling was made by Dr. Dwinelle, in 1855. He employed a piece of hard gold plate, held in position by a wedge, forming the mesial wall of the mesio-occlusal cavity, in an upper left second molar.

Later, we notice as a substitute for gold plate, the use of silver, German silver, copper or steel.

Following this, numerous ingeniously devised forms of band, clasp, depressed or "loop" matrices were to be found on the market, most any of which, when properly adjusted to certain forms of cavities, prove an invaluable aid in the insertion of fillings.

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*Read before the Chicago Dental Society, December, 1902.

My personal observation and experience, however, leads me to believe that, as a rule, we should make a special matrix for each individual case. Complex cavities, requiring the restoration of two, three, or even four walls, with possibly a gingival wall well under the gum, demand a specially constructed matrix to meet the requirements and for simple cases, the construction of a properly fitted matrix is so simple, that I also advocate it.

The method to which I wish to call your attention is but a slight elaboration of that described by Dr. Dwinelle. The material used may be either copper, German silver or steel, rolled to from 32 to 35 B. & S. gauge. From this cut a piece long enough that, when adjusted to an ordinary proximal complex cavity, for example, a disto-occlusal in a bicuspid, or molar, the ends will extend a few millimeters beyond the cavity margins into the buccal and lingual embrasures, and wide enough to extend from the occlusal to a trifle beyond the gingival wall.

Then with curved crown shears and contouring pliers, cut and contour this band of metal to properly fit the case at hand. Then roughen the ends, which are to lie against the buccal and lingual surfaces of the tooth, by simply cutting five or six slits in each, not more than one-half millimeter in depth.

A small hole made with a plate punch near the buccal and lingual corners next the gingival edge (through which the ligature is to be passed before adjusting the matrix), will prove a great convenience.

If the matrix is long—that is, if it is necessary to restore lost buccal and lingual walls, it is advisable to cut a couple of slits about one millimeter in depth, and a like distance apart, on the gingival edge of the band; then turn the flap between the two slips toward the occlusal, thus forming a little hook, which should, of course, be externally.

Make one of these hooks near the buccal and lingual embrasures on the gingival edge, and if thought necessary, on the occlusal edge also, the ends of the occlusal hooks to be turned gingivally.

(For the later suggestions, I wish to acknowledge my indebtedness to Dr. Ralph W. Parker.)

Having thus, in a few minutes, constructed the matrix desired, place it, and hold it in position by tying with a waxed silk ligature, encircling the tooth, not less than three, and possibly five or six times. The roughened ends and little holes or hooks will greatly assist in retaining the ligature in its proper position.

Should there be a proximating tooth, care should be taken that the ligature rests both gingivally and occlusally of the contact point, but that none be between the matrix and the point of contact.

When the matrix has a tendency to spring away from the gingival margin, and there is a proximating tooth, either apply a mechanical separator, or insert carefully, a triangular shaped wooden wedge from the lingual. By dipping the wedge into sandarac varnish of a syrupy consistency, removing the excess, and then inserting it, it will remain in position without difficulty.

If the cavity extends buccally or lingually, or both, use in addition an ordinary molar or bicuspid clamp, depending on the case at hand, to assist in the retention of the matrix.

There are exceptional cases where it is necessary to make a complete circular band, or loop, by soft soldering the ends together, after it has been carefully fitted, and then place in position, retaining it with wedges, or dam clamp.

For ordinary mesio-occluso-distal cavities, except it be in a molar having no proximating teeth, I very seldom adjust a loop matrix, using instead, a separate matrix for both mesial and distal cavities, thereby getting a more perfect adaptation in their adjustment.

Before removing the matrix, after the insertion of a plastic filling, trim the excess of filling material to approximate form, then take off the ligature and implements used in its proper retention, bend the buccal and lingual ends away from the filling; and, with long-beaked, flat-nosed pliers, obliterate the roughened lingual end of the matrix, or, if possible, clip it off with a pair of shears; then with flat-nosed pliers, grasp the buccal end, and carefully, but firmly, draw the matrix out buccally.

Plastic fillings should, of course, be given time to at least partially crystallize, but by removing the matrix buccally, or where the position indicates lingually, instead of occlusally, accidents in breaking off a portion of the filling will be greatly minimized in number.

The soldered loop matrix should be so fitted, especially where it supplies most of the surrounding walls of the cavity, that its position will not interfere with the natural occlusion of the teeth, nor should it impinge needlessly upon the gum tissue. Then after removing the excess of the filling material, trimming the occlusal surface to approximate form, remove the implements used in the adjustment of the matrix, but leave it in position, until a subsequent sitting, when the filling will have thoroughly set.

Then with a sharp instrument, cut the band and remove it. It seems hardly necessary to state, that where it is at all possible, the rubber dam should be placed. At least, keep the cavity dry, and if the interproximal space has been lost, by the dropping together of the teeth, proceed to re-establish it, by properly separating, to insure a normal interproximal space and contact, after the matrix is removed.

You have noticed that I have rather emphasized the use of the matrix for the insertion of plastic fillings, and in considering amalgam, I cannot do better than to quote from Dr. Black's "Technical Procedures in Filling Teeth," this rule—viz.:

"That all cavities filled with amalgam must have continuous surrounding walls during the building of the filling."

It is practically impossible to restore the proper contour to a filling, involving the proximo-bucco- or proximo-linguo-occlusal angle of a tooth, and get good adaptation of the amalgam to the walls and margins of a cavity, without the aid of a matrix.

To properly pack and condense amalgam into a cavity, flat-faced serrated pluggers should be used, as large as the cavity will conveniently accommodate; then all the force of which the hand is capable should be exerted in its condensation.

This being true, how could a perfect amalgam filling be made with one or more of the surrounding walls of a cavity missing? Continuous walls are absolutely necessary; therefore, the missing walls must be reproduced with a properly adjusted matrix.

Care must be taken, however, to use comparatively small masses of filling material, and into the angles and margins of the cavity next the matrix it should be condensed with small packers.

Considering cement, which it sometimes becomes necessary to insert in badly broken down bicuspids and molars, as well as in the anterior teeth, practically the same rules apply regarding the adjustment of a matrix, except that before adjusting, I coat the surface which is to be in contact with the filling with a very thin film of vaseline, to prevent the cement from adhering to the matrix.

son with a gavel, made from one of the British gunboats used in the war of 1812 and 1813.

Dr. Johnson expressed his thanks for the beautiful souvenir presented to him.

Dr. A. E. Webster, of Toronto, Canada, read a paper entitled "Temporary and Permanent Fillings as Barriers to Bacteria."

The discussion was opened by Dr. Jonathan Taft, Ann Arbor, Mich., and continued by Dr. G. V. I. Brown, of Milwaukee, Wisconsin; Dr. J. N. Crouse, Chicago, Illinois; Dr. George W. Cook, Chicago, Illinois; Dr. William A. Heckard, Indianapolis, Indiana; Dr. Henry W. Gillett, New York City, New York; Dr. Oliver Martin, Jr., Ottawa, Canada; Dr. T. M. Milan, Little Rock, Arkansas; Dr. J. B. Pherrin, Central City, Iowa; Dr. J. B. Willmott, Toronto, Canada; Dr. G. S. Caesar, Toronto, Canada; Dr. J. H. Woolley, Chicago, Illinois, and the discussion was closed by the essayist.

On motion, the Society then adjourned until 7:30 P. M.

EVENING SESSION.

SECOND SCIENTIFIC SESSION.

The Society reassembled at 8 P. M., and was called to order by the President.

Dr. Mark F. Finley, of Washington, D. C., offered the following resolution, which, after being discussed by Dr. J. A. Libbey, of Pittsburg, was unanimously adopted:

Resolved, That it is the sense of the Odontographic Society of Chicago, together with its guests, numbering twenty-eight hundred, assembled in its fifteenth anniversary meeting, that the enlistment of dental surgeons by the Navy Department to menial positions, detailing them to do professional service, is inconsistent with the character and value of the service required, and an inconsiderate disregard of the status which is accorded the dental profession by the State laws, by the State universities and other educational institutions, by the public of this and foreign countries, and by the Act of Congress creating an Army Dental Corps, whose members are equal in professional status with two-thirds of the members of the Medical Corps of the Army; and, further

Resolved, That the adoption of the pending bills on the subject, Senate No. 5914, House No. 13968, is the least that should be done to remedy the wrong against which the dental profession is thus forced to protest.

Dr. E. C. Kirk, of Philadelphia, Pennsylvania, then read a paper on "The Saliva as an Index of Faulty Metabolism."

In the absence of Dr. L. F. Barker, of the University of Chicago, who was appointed to open the discussion, Dr. Eugene S. Talbot, of Chicago, by invitation, did so. The discussion was continued by Drs. J. P. Buckley, Chicago, and G. V. Black, Chicago, after which Dr. Kirk closed the discussion.

Dr. G. Lenox Curtis, of New York, demonstrated an apparatus for generating ozone, after which the Society, on motion, adjourned until Tuesday afternoon.

TUESDAY, FEBRUARY 17th, 1903.

THIRD SCIENTIFIC SESSION.

The Society met at 2:30 P. M., and was called to order by the President.

Dr. Harry P. Carlton, of San Francisco, California, read a paper entitled "University Training and Dental Education."

The discussion was opened by Dr. H. W. Morgan, Nashville, Tennessee, and continued by Dr. J. D. Patterson, Kansas City, Missouri; Dr. Edmund Noyes, Chicago, Illinois; Dr. G. D. Sitherwood, Bloomington, Illinois; Dr. Truman W. Brophy, Chicago, Illinois; Dr. Edmund C. French, Eau Claire, Wisconsin; Dr. J. P. Root, Kansas City, Kansas; Dr. C. R. Taylor, Streator, Illinois, and the discussion closed by the author of the paper.

Dr. W. Warrington Evans, of Washington, D. C., read a paper on "The Possibilities of Prosthetic Dentistry from an Esthetic Point of View."

The discussion was opened by Dr. W. M. Bartlett, St. Louis, Missouri, and continued by Dr. F. H. Berry, Milwaukee, Wisconsin; Dr. J. Q. Byram, of Indianapolis, Indiana; Dr. L. P. Haskell, Chicago, Illinois, and the discussion closed by the essayist.

Adjourned.

THE BANQUET.

In the evening a banquet was held at the Auditorium Hotel. There were approximately five hundred and twenty dentists and guests who partook of the sumptuous repast. Dr. C. N. Johnson acted as Toastmaster.

Toasts were responded to as follows: 1. "Professional Unity," by Dr. J. B. Willmott, of Toronto, Canada. 2. "The East," by Dr. Henry W. Gillett, of New York. 3. "The West," by Dr. J. P. Root, of Kansas City, Kansas. 4. "The North," by Dr. H. L. Banzhaf, of Milwaukee, Wisconsin. 5. "The South," by Dr. D. R. Stubblefield, of Nashville, Tennessee. 6. "The Ladies," by Dr. B. Holly Smith, of Baltimore, Maryland.

At the conclusion of the responses to the set toasts, Dr. C. E. Bentley, Dr. George B. Perry, and Dr. R. Ottolengui sqoke briefly. Dr. Charles J. Sowle, of Rockford, Ill., recited "The Old Grindstone." Dr. George L. Field, of Detroit, recited a parody on "The Old Oaken Bucket."

At this juncture, the Toastmaster appointed Dr. Geo. B. Perry and Dr. C. E. Bentley to escort the newly elected President of the Society, Dr. Fred B. Noyes, to the chair. Dr. Noyes was warmly received. He thanked the members for the distinguished honor they had conferred upon him in electing him President of the Society. Dr. Root proposed three cheers for the Odontographic Society, which were lustily given. Dr. Thornton proposed a vote of thanks to the man who had presided over the greatest assembly of dentists the world has ever known, Dr. Johnson, which was followed by singing, "For He is a Jolly Good Fellow."

After a short speech by Dr. Cyrus M. Gingrich, of Baltimore, Maryland, the audience quietly dispersed.

WEDNESDAY, FEBRUARY 18th, 1903.

FOURTH SCIENTIFIC SESSION.

The Society met at 10 A. M., and was called to order by Dr. Johnson.

Dr. R. Ottolengui, of New York City, read a paper entitled, "A Rational Use of Porcelain in the Filling of Teeth."

The discussion was opened by Dr. W. A. Capon, Philadelphia, and continued by Dr. William T. Reeves, Chicago, Illinois; Dr. F. J. Capon, Toronto, Canada; Dr. W. H. Taggart, Chicago, Illinois; Dr. J. E. Nyman, Chicago, Illinois; Dr. Edmund Noyes, Chicago, Illinois; Dr. Henry W. Gillett, New York City, and the discussion closed by Dr. Ottolengui.

A vote of thanks from President Johnson to the members and guests for their marked attention in listening to the papers and discussions, and for their uniform courtesy, brought the proceedings to a close.

DETAILED REPORT.

MONDAY, FEBRUARY 16TH, 1903.

The Society was called to order at 10:45 A. M. by the President, who said: The first item on the program is an Address of Welcome. I think it wholly unneccesary to take up the valuable time of this meeting in any expressions of welcome to this body of men. It is understood that all the dental profession are welcome to Chicago at this time. We are here simply for the purpose of entertaining you at one of the best clinics we are able to give in this city: and so in view of the fact that we have been somewhat detained by the registration of dentists, and that we have a very important paper this morning, I do not feel that I should detain you. I simply want to express our appreciation at the magnificent turn-out of dentists this morning.

I have only this to say in regard to entertainment: While you are here, if there is anything we can do for you, that we do not do, if you will ask us, and it is in our power, you shall have it done. (Applause.)

Announcements will be made at the end of the morning session by the Chairmen of the various committees, also of entertainments to be given during your stay in Chicago.

I can only say, in addition to what I have said, you are welcome here at this time. We hope your stay in Chicago will be pleasant and profitable.

Before we begin the regular order of business, Dr. Thornton, of Chatham, Ont., has a word to say. (Applause.)

PRESENTATION OF GAVEL.

Dr. A. W. Thornton, of Chatham, Ontario:

Mr. President, Ladies and Gentlemen:—I shall take but a moment or two of the valuable time of this Society. I wish to present to the President of this body a gavel. The presentation may seem somewhat strange, coming, as it does, from a man who is an out and out Canadian, and one who is intensely loyal to everything that is British. This gavel was made from one of the British gunboats that took part in the war of 1812-13. The British were retreating from the vicinity of Detroit up the Thames River, and to keep the guns from falling into the hands of the Americans, it was burnt by order of the British General, and sunk about two miles further up the river, where I practice—Chatham. This may seem to you an evidence of British failure and of British defeat, and I confess, Sir, it is so. But there is no country worthy of the name of a nation that has gone down before defeat and disaster; no country that is worthy of the name that has not risen superior to such defeats. And so, Mr. President, because we are Britons and because we are Americans, in the vocabulary and characteristics of these two countries, there is no such word as defeat. There may come disaster, but because of that disaster we go forward with renewed determination to greater and to better things, and because of that I present this gavel to you (turning to Dr. Johnson) this morning. I need not remind you gentlemen here that the disasters and defeat that have come to British and American arms are only temporary, and let me say as the result of those disasters and defeat both nations have come to be better and stronger. I need not remind you that during that war the men of Detroit (there are some here today from Detroit) were British subjects for a time. (Laughter.) I simply wish to say, that I trust all differences, all animosities, national, social, yes, professional, that have existed between these two countries for so many years may be as deeply buried out of sight as was the old gunboat which lay in the bottom of the river for the past ninety years. (Applause.)

At the conclusion of this meeting, it is my desire that this gavel shall become the property of Dr. Johnson. I presume you know that Dr. Johnson is a born Canadian, and while I do not believe in fulsome flattery, I can say this much of him, that he is a citizen of whom at least, we are not ashamed, and in presenting it to him, I am reminded of a story I heard not long ago.

An Irishman went into a train and found that all the seats were taken. He saw an Englishman with a fine specimen of dog with him, sitting by his side. The conductor came along, when the Irishman asked him for a seat, and the conductor replied, "I think you will have to stand." The Irishman then said to the conductor, "I have as good a right to a seat as that dog has." The conductor said, "That is so." The conductor then went to the Englishman and said, "You will have to put down the dog and give the gentleman who is standing a seat." The Irishman sat down, but he was going to show that he was not mad at the Englishman. After awhile he said to the Englishman, "That's a foine dog you have. I would like to ask what breed he is?" At this remark the Englishman instinctively turned up his nose, but did not reply. Pat was not easily squelched, so he said a little later on, "I was just afther asking yez what breed yer dog is." Thereupon the Englishman said, with a good deal of contempt, "He is a cross between an ape and an Irishman." Pat quickly replied, "Then, begobs, he is related to both of us." (Laughter and applause.)

ACCEPTANCE OF THE GAVEL BY DR. JOHNSON.

In accepting the gavel, Dr. Johnson said: Dr. Thornton, I wish to express my appreciation, not only on behalf of the Odontographic Society of Chicago, but on my own personal behalf, for the beautiful souvenir you have given to us at this time.

You have said that this gavel came from a ship that was being chased by the Yankees. It is only another illustration that whatever the Yankees go for, they get—some time. (Applause.) I think I express the sentiment of every American when I say that we would rather get it in the friendly spirit in which it comes today than to get it in battle conflict between these two nations.

A few years ago I remember when the National Dental Association was made the guests of the Toronto dentists, they went over there in a body. We had excellent addresses, and one of them was made by our old friend, Dr. Truman, of Philadelphia. He regretted in that address that the two countries could not be united. Dr. Willmott, a good friend of mine, said, yes, it had occurred to him it would have been the proper thing to have the United States annexed to Canada. (Laughter.)

I was somewhat amazed to find that men of affairs as they are, who know the progress of events as they do, were not aware of the fact that Canada and the United States were already annexed. They are annexed in all those things that go to make up the better elements of life—human sympathy, fraternal feeling, cordial interchange of courtesies, such as those exhibited on this occasion. We have a representative gathering here today from the other side, and we welcome them. We are one in heart, and one in purpose. I accept this beautiful gavel in the spirit in which it has been given. I shall try to wield it to the best of my ability, and at the close of the meeting I shall preserve it as a souvenir, and prize it highly as long as I live. I thank you sincerely, Dr. Thornton. (Applause.)

Dr. Clack, of Iowa:

Allow me, Mr. President, as an American, who is of British blood, to express this sentiment: You spoke of the Yankees getting what they go after. That is all true, and I believe today there is not a British subject, no matter how loyal he may be to His Majesty, who would not, if any of the British possessions were seized, rather the Yankees had them than any other nation on earth. (Applause.)

Dr. A. E. Webster, of Toronto, Canada, read a paper entitled, "Temporary and Permanent Fillings as Barriers to Bacteria."

DISCUSSION.

Dr. Jonathan Taft, of Ann Arbor, Michigan:

Ladies and Gentlemen:—It is rare, indeed, that an opportunity has hitherto been afforded us to meet so large a number of the profession as are assembled here today.

In reference to this paper, I presume the unanimous voice of those who heard it would be that it is one of great value. It is beyond the ordinary papers that are presented upon such occasions. It is really, in one sense, a new line of thought, and experimentation. I hope the paper will impress every member present as to the value of experimentation along this line, as well as other lines of practice.

I will not attempt to follow it in its details, but will simply draw some conclusions in reference to the value of such work and what ought to be regarded in all such investigations.

This paper has reference to the management of pulpless teeth. No more important question could be presented for our consideration. This is one of the lines of practice in which there is a very considerable lack among the members of the profession; inability to manage and to treat such cases and to avoid serious difficulties which so frequently arise from pulpless teeth, and anything that will minimize these evil results will be a boon.

The experiments that have been detailed are interesting and valuable to everyone who follows them closely, and who takes in the importance and possibilities of such work. Certain things, however, should be borne in mind when we come to make experiments in this line that have not been referred to in the paper, and I will call attention to them briefly.

We should not hastily conclude that the experiments detailed and results obtained in glass tubes would be repeated in the roots of teeth, because the conditions are very different from those in the mouth. We have here, for instance, a glass tube of non-vital material, a very firm, solid material. But in regard to the roots of teeth we have there a tissue or structure that is possessed with great vitality. This vitality will modify the results somewhat. I presume the author of the paper took this into account, as he should do. The performance of experiments like these out of the mouth is very different from those in the mouth. There are changes constantly taking place in the mouth, and do the best we may in imitating them, we cannot do it out of the mouth. The tubes here, of course, would have a certain temperature, and they might be supposed to imitate changes and vicissitudes of temperature in the mouth, but they cannot be reproduced exactly.

Saliva is used and taken from the mouth, but the changes that occur in the mouth would hardly be imitated by these experiments. All these things must be considered. The canals of the dentine are filled with a material, that plasma which enters into and through which the nutrition of the living dentine is supplied. It is this material, then, which cannot be present in the preparations that have been detailed. This material undergoes a change very frequently—a very marked change in a short time after the destruction of the pulp. That ought to be estimated; it probably was estimated by the author of the paper. Those are some of the points that seem to indicate the great caution which should be exercised if we are to understand clearly the failure in correspondence to those conditions.

One tooth is quite different from another. Some teeth, as you know, promptly, after devitalization of the pulps, become changed in color, indicating a change in the organic material that enters into the make-up of that tissue. In other teeth the change in color is far more tardy, indicating that there is more nearly a permanent condition of the elements that enter into the make-up of the dentine. I thought I would draw the attention of the members of this body to these facts, in order that they may be thought over. Some of us may endeavor to verify the experiments that have been detailed, or may see fit to repeat them and see how nearly we reach the conclusions that have been arrived at by the author of the paper. This paper is an unusually good one. It will stimulate us to work in this direction. There is hardly any line of practice, especially upon the natural teeth, where more slipshod work is done than in the treatment of the pulpless canals of teeth. Each one of us has a routine method which he pursues, and scarcely ever departs from it, nor does he seek to try a new experiment. It was formerly a common practice among members of the profession to make applications to the canals of teeth with a view to rendering them antiseptic, or preventing them from becoming septic again. Ordinary cotton, silk fiber, or linen fiber, or something of that kind was used as a stopping. This does not meet the indications of the case ordinarily, and I am glad our attention has been directed to that mode of practice, and that after awhile common sense will discourage it. The canal of a tooth, when treated, ought to be cared for in the way of exclusion of secretions from the mouth as thoroughly as possible, or as any cavity that is to be filled. Moisture of the mouth should be entirely excluded during the time one is working upon it, and then the cavity sealed so perfectly that moisture cannot enter it when the rubber dam is removed.

We should not rely simply on cotton, cotton and sandarac, or any of the other preparations alone. Oxychloride of zinc has been referred to as a valuable preparation for sealing a tooth canal. I have used with very great satisfaction a solution of silver nitrate in the treatment of canals of teeth, simply placing it in cavities and sealing it as hermetically as possible, absolutely excluding moisture. The nitrate of silver acts upon the dentine and destroys any bacteria that may be present, and the lime salts are in a small degree dissolved by it. The oxide of silver deposit upon the dentine, I apprehend will prevent the occurrence or intrusion of microörganisms. I have come to this conclusion from experimentation and from its use clinically for many years. One objection is that it may change the color of the tooth to which it is applied, but it ought not to affect the crown if applied to the root of a tooth.

Dr. G. V. I. Brown, of Milwaukee, Wisconsin:

We have now reached a point where our old theories as to germs and the germ theory of decay will not satisfy us any longer. To me, it is very opportune that this paper should have been given at this time, when Dr. Miller, of Berlin, is echoing through the *Dental Cosmos* his views on subjects that are interesting to all of us.

What is the relation of fillings inserted in glass tubes to the filling of root canals and cavities of teeth in the human mouth? Following my own line of reasoning, we must add to these results, which are hopelessly discouraging, the difficulty of inserting fillings of any kind in the human mouth, and the personal equation, the variation between individuals, which will undoubtedly give us even worse results.

The question is, What of it? All of us know we have put in fillings that have lasted for many, many years, and we know that the great majority of them last a very much longer period of time than has been shown by the citation of these experiments; at least, in preventing caries, and the various suppurative processes due to pathogenic germs. Now, then, why do they?

I removed from one of my central incisors the other day, in the laboratory, a gutta percha filling that had been inserted approximately twenty-two years. There is no question at all but what that filling must have been leaking during those years. Judging from these experiments, moisture and bacteria gained access to that cavity. The question was, What is the condition of the dentine of that tooth under that filling? The rubber dam, the various instruments, my hands, and everything that touched the part were thoroughly sterilized. The tooth was isolated with rubber dam, and so far as possible the teeth themselves were sterilized. This gutta percha filling was removed and cultures taken from the bottom of the cavity, also from the outside of the tooth, and from the rubber dam. I know very well, to my sorrow, that I am not immune to dental caries, and in order that that might be settled positively, cultures were taken from different portions of my mouth. I am sorry to say that somewhere the results of these experiments at present are wandering about hunting me, in the shape of a letter. I will get that letter undoubtedly during the day, when the results will be announced to you.

If there be infection, what of it? We know that caries was not there. We know that germs in that situation have no longer those properties which tend to the production of lactic acid or those saprophytic conditions which tend to break down tooth structure. On the other hand, if there be no infection, we then know that germs could not have gained access to the cavity, could not have lived there, and the result is the same either way.

Dr. J. N. Crouse, of Chicago:

The paper interested me very much, because it is on a line I am working on myself, not so much with a view, however, to find out what material is the best to fill the roots of teeth with, as what filling materials shrink and what do not. That, I think, is the most important question of all. For my own part, there is nothing equal to oxychloride of zinc as a root filling, provided you get a good quality, which is impervious to moisture, except that it is difficult to make sure that it does not draw away with the instrument. To avoid that, I wrap No. 10 gold foil around a rather small broach, carrying the oxychloride of zinc with that, and having it so fit that when the broach draws away, it leaves the gold foil there.

As to the question of shrinkage of gutta percha, I have had considerable experience with it, and I have been amazed to find the amount of shrinkage that takes place with gutta percha.

As to amalgam, I would not know how to put amalgam into the root of a tooth for the purpose of filling it.

Dr. George W. Cook, of Chicago:

I have been very much interested in this paper of Dr. Webster, and attempted a short time ago to make a few experiments. Early in my work in bacteriology I spent a good deal of time in the laboratory with Professor Klebs, the man who discovered the bacterium of diphtheria. I talked with him on this subject, and asked him why it was that test tubes in bacteriological work were stopped with cotton instead of some other material. He told me at the time that Pasteur, who really might be called the father of bacteriological work, had experimented with all kinds of mechanical means to prevent the passage af bacteria, especially where there was any moisture. I called his attention to the filling material, and explained its manufacture and its manipulation as well as possible, and he said to me that it would be absolute folly for us to think of preventing bacteria from passing through the material under certain circumstances. He said, further, that there was always more or less contraction of the material, and that a change takes place in glass tubes. I mentioned the fact to him that I would like to carry on some experiments of this kind, and he said to me that I could not manipulate the material in glass tubes; that I could not apply sufficient pressure on the tubes to prevent the passage of bacteria through the filling material. He suggested that the only means would be to take an ordinary test tube, such as is used for culture work, filled with bouillon, drawing the tube into a neck, as suggested by Dr. Webster. My tubes were sterile, those that I have tested, and that has been recently. With the cotton stoppers in the tubes, I placed my test tube over a hot blaze, heated it to a certain point, so that there was elasticity to the glass tube, and the bouillon and the contents of the tube were perfectly sterile. Then, under as nearly aseptic precautions as possible, I filled the necks of these tubes in the way Dr. Webster has. My tests were not extended over the number of days that he has carried his; but the majority of my tubes were sterile after ten or twelve days. Those I have I intended to bring to this meeting, and should have done so if I had known exactly the nature of the paper that has been read. I could have shown a dozen and a half of the tubes that I filled, and the cultures are growing over the cement, while the bouillon in the lower part of the tube is sterile at the present time.

Now, there are probably some objections to that. First of all, the position of the tube necessary, and the lack of moisture at the lower end of the filling. I, after six or seven days, when the infection did not pass through, turned some of these tubes down on the side, so that the bouillon in the lower portion might come up to the filling, and in some cases they became infected, while in others they did not.

The results of Dr. Webster's experiments coincide very much with my own, in the majority of cases, with the exception that I do not find the cements are as easily penetrated as he has found in his experiments.

It is known that when the same microörganism is constantly in contact with such cements as are used in manipulation work, after some days or weeks there is an enzymic action of the bacteria on the cement, which causes a slight disintegration of the surface, and eventually, if kept in contact, will destroy the entire mass. What is the result? In the tooth structure we have not the constant contact of bacteria, such as we have in cultivation work in the laboratory. They are passed over the cement, cleansed off by the fluids of the mouth, and the bacteria that produce all these various enzymic actions cause disintegration of almost anything. There is hardly anything that will resist the action of bacteria if they are constantly in contact with it. So in the mouth we have a decided difference from that in the ordinary culture tubes, such as I have experimented with. For instance, this portion of the tube (referring to a tube on the blackboard), I have filled with cement, and here are growths for ten or twelve days, at the upper portion of it. Necessarily, there will be disintegration, especially if I should add culture media to that culture, in order that its action may be continued. But in the mouth we do not have that constant contact, and Dr. Taft brought out one very interesting point, that is, the resistance of the human tissue, the resistance of the saliva, etc. We know in our experimental work that the saliva of different individuals has altogether an entirely different action on the products of bacteria. I have found pathogenic organisms many times in the saliva of individuals, and where I changed the saliva of one individual to another, I have rendered those microörganisms non-pathogenic, consequently, the change in saliva is due largely to the electrolytic action of the saliva or the salts in the saliva, and all these factors have a great influence upon the action of bacteria. The moment bacteria begin to grow in culture media, almost that instant they have changed the culture media from what they were originally. They produce acids or alkalies, or they may produce an enzyme that is capable of fermenting or causing disintegration of almost anything. It does not necessarily have to be acid. It is well-known that many of the bacteria of putrefaction do not produce acids, yet they will cause disintegration.

While these experiments teach us something that is of inestimable value in calling our attention to the possibilities of these things, still, as Dr. Webster and Dr. Taft have already said, we have to recognize that there is a vital resistance to reckon with.

Dr. W. A. Heckard, of Indianapolis, Indiana:

We have listened to a paper dealing with the scientific aspect almost exclusively, but I wish to say a few words on the empirical side, not because I am not a scientist, or am opposed to the things that were taught me as a student—quite the contrary. A graduate of Johns Hopkins, a bacteriologist, made some experiments with reference to the growth of different kinds of bacteria on or about different metals, using small disks of metal about the size of a five dollar gold piece. These he placed in properly prepared and inoculated dishes, and he found that each metal had some power of keeping away the bacteria, some more than others, for there were zones of different widths around the pieces of metal. I forget all the different metals he used, but I do remember that gold and platinum were in the tests, and about them was a large zone where bacteria would not cross. Experiments were also made to show that a few bacteria, even of contagion, were not sufficient to multiply and do harm when taken into the human system. Bacteria will live a long time in a root canal without doing any harm, multiply a little, and not die. They may exist in root canals for years and do no damage. I filled some root canals years ago with cotton, saturated with oil of cloves, as once suggested by Dr. Flagg. I have taken some of these fillings out after ten years, and the odor of oil of cloves was still present. In some I could also smell the odor of bacteria. (Laughter.) My reason for mentioning this is, the essayist said that the antiseptic properties of medicines left in root canals disseminated. I do not think so, if sealed in, and I think they can be sealed in. Though there were some bacteria in some roots, they were doing no harm in my estimation, as they could go no farther.

Dr. Henry W. Gillett, of New York City:

I want to express my appreciation of Dr. Webster's work, and to say a word or two along the side-line which he touched upon. When he suggested that probably one-half of the abscesses develop from the imperfect manner in which the roots of teeth are filled, or that they develop from inoculation, working in from the outside, rather than from the apical end, the thought occurred to me at the moment that probably nine-tenths of them came from the operator leaving in the canal material which he thought he had cleansed, or what he put there, by not observing rigid aseptic precautions in doing his work. The profession must realize that in filling root canals we must observe rigid aseptic principles. Some of us do, but many of us have not in the past.

DR. OLIVER MARTIN, JR., of Ottawa, Canada:

This subject is fraught with a great deal of interest, and in the light of Dr. Webster's admirable paper, one of the thoughts which occurred to me in connection with our theory of instrumentation is this: We should always be as clean and aseptic in our work as possible, but very often our manipulations are faulty. Aseptic precautions and thorough manipulation are absolutely essential to obtain successful results.

As far as filling materials are concerned, I am an oxychloride of zinc man. I was brought up to be an amalgam man, as my professional relatives have been very successful in filling teeth with this material. I have seen teeth that were filled with amalgam that stood for eighteen or twenty years.

With reference to the method of filling roots, I do not believe it matters much what is inside, provided the cavity is thoroughly and hermetically sealed. Trouble arises very often because we are not able to get at the parts. There is no royal road to success in this line of work, but we should strive to do the best we can at all times, and yet occasionally, after taking all the precautions we think are necessary to obtain good results, we are confronted with failure.

DR. T. H. MILAN, of Little Rock, Arkansas:

Arkansas is a State bordering on the Indian Territory. We do not know a great deal about bacteria or diseases of the mouth in Arkansas, because our patients do not have them. For thirty-five years I have been trying to follow in the footsteps of Dr. Taft and Dr. Morgan, and I have never failed to cure abscessed teeth, in thirty years' practice, if they were fixed right. (Laughter.) I have used carbolic acid for twenty-five years in my practice in connection with the filling of teeth, and the majority of those teeth are standing today, but the work was done right. (Laughter.) Give me the tooth of any man in this city to fill, and if I can open it up right, and finish it right, I will save it.

DR. J. B. PHERRIN, of Central City, Iowa:

We can hardly estimate the value of this paper. It has brought out a discussion we are all interested in, and it is to be hoped that something of practical value will come of it. Taking the experience of old dental practitioners, and what we see in the mouths of our patients, we must admit that it is the best, the most careful work that succeeds, and that many of our failures are due to carelessness.

I came here not so much to discuss this paper as to tell you what I have seen, and perhaps all of you have seen. Not a great while ago I saw some cement fillings, oxyphosphate fillings, that have been in the mouth of a patient for at least twenty-three years. They were perfect then at the point of contact. They were hard. There was no sign of disintegration of the cement or of the enamel at the margin. That is something no one has been able to explain. We see fillings that have been in the mouth as long as thirty years; they remain in pulpless teeth in good condition, while the other teeth with normal pulps have been lost. Not a great while ago I extracted a tooth that Dr. J. B. Allen had filled twenty-six years before with chloro-percha, and it was the only firm tooth in the alveolus, and the whole mouth was full of teeth. I found, contrary to what one gentleman has said here, that chloro-percha was forced through the apical foramen. There was quite a quantity of it beyond the apical foramen. It is my practice not to use a gutta percha cone, but to use chloro-percha, forcing it through the canal, if I can, and I think I have done perfect work in this way. I would like, if possible, to extract more of those teeth that as yet I have never been compelled to extract, but which I have filled in that way. Of those filled with chloro-percha I have never extracted one.

Dr. J. B. Willmott, of Toronto, Canada:

I do not want to inflict too much Canada on this audience, yet I wish to say a word or two with reference to this paper, not from a scientific aspect, for I am not a bacteriologist, but to call attention to the point that so far as discoloration is concerned, it proves too much. If it proves anything at all, it proves that every one of these fillings should prevent the egress of fluid. It is quite true that tubes 26 and 24 are colored, but two were not. What does that prove? It proves that if all the fillings were perfectly put in these tubes none of them would have been colored. Just so with the others. If these tubes were properly filled, every one of these materials would absolutely have prevented the absorption of moisture.

A word or two more on this series of experiments which I happen to know something about. The tubes were not capable of resisting the pressure which any ordinary dentist would put on the root of a tooth. I tested them, and everyone of them broke under much less pressure than I think necessary to fill a root, so that these tubes, with all of these materials, were filled with a much less degree of pressure than is necessary to fill the roots of teeth in the human mouth. The chloro-percha ones showed better results, because these required much less pressure.

I simply call attention to these facts, so that we may not draw unjustifiable conclusions. We want to know something about the conditions under which these experiments were performed. They are an object lesson, and I have been exceedingly well pleased with the paper. So far as we can judge the experiments seem to have been performed under more favorable circumstances than with the roots of teeth filled in the mouth. If out of the mouth the results are unsatisfactory, it is not to be wondered at that they are unsatisfactory in the mouth.

Dr. G. S. Caesar, of Toronto, Canada:

First, I wish to congratulate Dr. Webster upon his scientific and thorough paper, and to say that it is the beginning of a work which we hope will prove more than has been shown today.

With reference to chloro-percha and oxychloride of zinc fillings for roots of teeth, after over thirty years' experience, I must agree with the gentleman from Arkansas when he says that if the work is properly done, we will not have much trouble with the bugs. I was taught to fill root canals with oxychloride of zinc, and when I did it right they were satisfactory. When I forced the material through the apical foramen, I had trouble. That was my fault. I have been criticised repeatedly for filling root canals with oxychloride of zinc, yet this paper has demonstrated that it is one of the best materials for this purpose.

I want to make one remark regarding chloro-percha. In making a solution of chloro-percha, when you have applied the chloroform, stir it up and add eucalyptol until you have it in a nice, creamy state, then leave the cork out of the bottle and allow the chloroform largely to evaporate. You then have a solution which if forced through the apical foramen, will cause less irritation than will chloroform.

Dr. J. H. Woolley, of Chicago:

When the essayist closes the discussion, I wish he would state whether attention was paid to the filling materials that were put into these glass tubes; whether those materials were rendered perfectly aseptic, and whether the same care was used in the preparation of all of these materials? Furthermore, I would like him to answer the question whether he was careful in the introduction of the fillings into these tubes, so as to exclude the possibility of introducing infected air along with them?

Dr. Webster (closing the discussion):

I do not desire to say very much in closing the discussion on my paper. It would seem that the whole discussion can be summed up under three heads, vitality, dosage of bacteria, materials and manipulation. In the paper it is distinctly stated that because of the vital resistance the experiments could not be made in the mouth, and consequently, as the experiments were not made in the mouth, the vital question is not under discussion at all. It is a question of materials and not of vitality. Do certain materials, as commonly manipulated, resist the passage of bacteria? is the real question under discussion. We hear a good deal about what materials should be used to fill root canals. But if these materials leak bacteria (and there is no doubt about it) and the teeth give no trouble, why fill root canals at all? The fact is that much of the discussion as to whether canals should be filled with oxyphosphate or gutta percha is waste of time, they are equally useless for the purpose for which they are inserted. We are driven to the conclusion that it is the vital resistance that prevents abscesses in such cases.

It is quite true that a root filled with a fairly non-porous material has a better chance for future success than one not filled at all, which often becomes filled with a fluid which is a culture medium. In the first case the dosage of bacteria in contact with the tissues is very small, while in the other it is large. Nature can and does resist a small dose of bacteria, but when excessive doses are present infection, or rather inflammation occurs.

The discussion of the materials and their manufacture was rather limited. Dr. Cook mentioned corroborative experiments which were very gratifying to me. His criticism of the possibility of thoroughly packing against glass walls, and the change of form of the glass, is not quite good, because in my experiments all such difficulties were overcome by using heavy glass, flat base to cavities, ground inner surface of bulb, and a constant temperature of the glass. No change of form could come to the glass, and it is quite strong enough to bear at least ten to thirty pounds' pressure, which is all and more than is ordinarily put upon most fillings. The same is quite true of the root canal fillings. If any of the gentlemen desire to see these tubes they are here and I am certain they will be satisfied that they are strong enough to bear the insertion of a good solid filling. Dr. Cook says he did not find leakage of cement quite so soon after insertion as my experiments show. This may be explained by pointing out that most of the experiments I have reported were made as temporary operations and leaked much sooner than those which were made as permanent operations. The time of leakage in my permanent operations was about the same as those reported by Dr. Cook.

Some one raised the question as to the materials not being sterile when inserted. The answer to this is that in my paper there is a statement as to how they were sterilized and as to how the control tubes were kept. The control tubes which were not put into the saliva were not infected while those tubes which were put into the saliva were infected. This shows that the technique was accurate.

CHICAGO DENTAL SOCIETY.

A regular meeting was held in the Schiller Building, Dec. 2, 1902, with the president, Dr. Elgin MaWhinney, in the chair.

Dr. George W. Haskins read a paper entitled "The Use of Non-Cohesive Gold."

DISCUSSION.

Dr. E. A. Royce:

The profession has neglected the use of non-cohesive gold of late years, and when this subject is brought before the society in such an intelligent manner as it has been this evening, I should like to see a larger attendance of members to listen to the explanation and see the illustrations. The only way which this paper will reach the majority of the members is through the dental journals.

The preparation of cavities for non-cohesive gold, as presented by the essayist, I heartily endorse. I know of but one non-cohesive gold, and that is Abbey's. I use No. 4, and have for many years. I have used other forms of gold at different times and have found them cohesive.

The other day I procured Williams' No. 3 non-cohesive gold, put it on my annealer, used my mallet, and I made a nice contour. I could not continue building with Abbey's gold.

With reference to the method of rolling cylinders, I think I can give some of you a pointer who may attempt it. We must consider the different locations and different cylinders in this work. In some places we want a solid cylinder; in other places we want an open cylinder, so that we can make an ellipse. I have procured a set of clock maker's broaches, so that I have broaches of different sizes. For a solid cylinder a very fine broach is used; for open cylinders larger broaches are used. I find it takes but a few seconds to make a cylinder if I have the gold folded the proper widths.

As to the manner of using non-cohesive gold in a cavity such as has been illustrated by the essayist, perhaps I can use the model of the essayist to show the method I have employed. It is not my method, but one that I was taught a number of years ago. I put a cylinder in each corner (demonstrating on model), then I force a third cylinder in the center. They are long enough to extend from the matrix to the pulpal wall. They are condensed thoroughly. After you have placed as much non-cohesive gold as you wish in the cavity there are several ways of starting the cohesive gold. The essayist's method of putting in a central cylinder of cohesive gold and building on it, is a good one, but often one layer of cylinders will extend as high as you wish in the cavity; when this is the case I generally use a wedge-shaped instrument to force down into the non-cohesive gold and start my cohesive gold filling in the opening made.

There is one point that the essayist did not mention which I think it quite essential. I have never found it advisable to allow the contact points to be of non-cohesive gold. I prefer to have the contact points of well-malleted cohesive gold. Perhaps I can give my reasons for it. The hardness of non-cohesive gold is brought about, the same as the hardness of this paper would be (referring to a book with covers), if these covers were bolted together tightly. If you allow the paper to extend beyond the covers, you have loose paper. I find in contouring work that if the non-cohesive gold extends beyond the sides of the cavity or binding point it is not as solid as cohesive gold. If you had a filling straight across it would be a different story. But I find the contour is not preserved as well with any condensation I can make in a cavity of this kind with non-cohesive gold. I have seen most beautiful contour fillings put into cavities of this kind with non-cohesive gold. Every leaf of gold ran from the bottom of the cavity up, so that there was a series of leaves extending as this paper stands, wedged in perfectly and nicely, doing good service. But I have never acquired skill enough in the working of non-cohesive gold to do that, or to think of contouring the entire filling in that class of cavities with non-cohesive gold. I do not think it is advisable. But I have seen beautiful work of that kind done.

As to the filling of occlusal cavities, I must take issue with the essayist. As he stated, in filling an occlusal cavity he would go clear across and fill each projection of the cross with non-cohesive gold, drive it from the center towards the sides, and then fill in the center with cohesive gold. In driving the gold from the center to the sides he uses a mallet or hand force directly toward the side of the cavity. According to my idea, that is not the strongest force he can obtain, because the wearing qualities of the gold are the same as the leaves of this book (holding up book) bound together. If the doctor will investigate, he will find that experts, who are able to make non-cohesive gold to within 34-100 of 1 per cent the solidity of cast gold, do not use a mallet but a wedge to obtain a lateral force with which to accomplish it.

As to the length of the cylinders used in an occlusal cavity I should fill that cavity with a little shorter cylinder than he advocates, because I should try to get force to press the gold so tightly against the walls of the cavity as not to be able to condense it very much from the surface. I do not believe in depending upon surface condensation. Let us take an example. If you crinkle this paper up (referring to paper in a book) it will not wear at all; if you let these leaves extend beyond the covers and the covers are a little loose you cannot drive the paper between the covers to make it solid, but if you bind the covers you have a solid mass of paper, and the same thing holds true with regard to the condensation of gold. I believe if I can condense my gold principally with lateral force and cut it off so that the sheet of gold goes from the bottom of the cavity to the top, being one continuous sheet, I get twice the wear that I will if I leave it a little loose. In obtaining this, of course, I use wedge-shaped pluggers. I fill the cavity with solid cylinders that are a little longer than the depth of the cavity standing on end, and when I have placed all that I can I put a wedge-shaped instrument down through the gold from the top to the bottom. I would make an opening wide enough, and to do so I might have to use two sizes of this wedge-shaped instrument, possibly three, to get an opening sufficient to receive the cylinder. I would then crowd it against the wall of the cavity and put in new cylinders. After I had gotten all the cylinders possible into the cavity I would condense the surface with a good-sized plugger point, following with a small plugger point, and a heavy mallet, to find out if there was a weak place that was not absolutely condensed. You can imagine the force of condensation. The same old plugger I have told you about on a previous occasion is wedge-shaped, which measures in length six and in breadth two, and you know the law of increase of force. With that plugger the increase of force applied to the gold is six times and is converted into a lateral force. For instance, if you put ten pounds of pressure or force on the plugger, you are putting sixty pounds of lateral pressure on the gold, crowding the gold solid. You can have a less tapering instrument than that if you desire. I have a small one in which the tapering is less than two to six, so that I have a greater force for the smaller point. The only thing is to be careful that you do not split the tooth. The surface condensation should be very thorough. The malleting is essential. But the first condensation in occlusal cavities in my mind is a lateral one, and if you are going to fill half of the cavity with non-cohesive gold, I can see no reason for putting in cohesive gold, provided it is an appropriate cavity for non-cohesive gold. I mean an occlusal cavity where you have all the walls standing.

A few years ago I was at a clinic and saw non-cohesive gold inserted in a lower molar, and I thought the operator used more force in putting in that filling than was absolutely necessary, for the reason he did not have his plugger points tapered and shaped properly. Instead of using a small point, getting between the cylinders, and then a little larger one, etc., to get an opening for a good-sized cylinder, he attempted to do it all at one time. Therefore, he punished his patient severely and took a long time to accomplish his object. I use a round instrument because I have round cylinders to replace.

Another thing: Each cylinder, without any tucking, should go to the bottom of the cavity; that is, your opening should be nearly the same size the whole length, so that the new cylinder will absolutely go to the bottom of the cavity, not half-way down.

Dr. F. E. Roach:

I heartily agree with the essayist that the use of non-cohesive gold is a great tooth and time saver as well as a great dentist saver. It is a better tooth saver for the reason that it can be more perfectly adapted to the cavity walls. The fact that two or three large rolls of non-cohesive can be made to more perfectly fill the gingival third of the cavity in a few minutes than a great many pieces of cohesive that would require an hour to insert, makes it a time saver of the first degree. As a saver of dentists there is no question, for surely there is nothing more wearing on the dentist than the insertion of large gold fillings in any part of the mouth, and more especially the large restorations referred to in the paper.

While I have not made much use of non-cohesive gold in combination with the cohesive, I have used tin foil in almost the same way with even better results. I am a great believer in the preservative powers of tin and as a preventive of recurrence of decay at this most vulnerable point, the gingival margin, there can be no doubt.

The combination of the three in some cases is advantageous and advisable, using the tin at the gingival margin, the non-cohesive gold at the buccal and lingual angles and completing the filling with cohesive gold.

I think the essayist's reference to grooves in the gingival, buccal and lingual walls is a little misleading. He speaks of a "decided retentive groove." I cannot believe that he means such grooves as have been made for starting and retaining cohesive gold fillings and yet his emphasis of "decided retentive grooves" would lead one to believe that they are such. I am of the opinion that a square base very slightly roughened is all that is necessary and is certainly more easily filled. He also speaks of using the inverted cone bur in the preparation of occlusal cavities. Perpendicular walls at right angles with the floor of the cavity slightly roughened with a cross-cut bur are all that is necessary for retention and such a cavity is more easily filled. I try to avoid pits, grooves and acute angles in all cavity preparation and especially in gold work.

Cohesive gold has done for non-cohesive gold what vulcanite has done for metal plate work. It has reduced the number of non-cohesive operators until it seems that its use bids fair to become a lost art.

I shall ever feel grateful to the late Dr. Morgan of Nashville, Tenn., for his instructions in the use of this most valuable filling material. It was seeing the beautiful results of this masterful genius with non-cohesive gold that led me to adopt its use.

DR. J. G. REID:

One thing that impressed me was the simplicity of the description of the use of so useful a metal as non-cohesive gold, as well as the ability of the essayist to demonstrate its use. It impressed me as being one of the nicest exposes of this kind that I have ever seen before any dental society. It is so plain that anyone who runs may read and see.

I have considerable faith in this sort of operation, and instead of using non-cohesive gold I use a great deal of gold and tin. This, however, is not the subject of the paper, and therefore I shall not dwell on it. The similarity of use of the two metals, their condensation and application in that locality is great. The only difference is that I use gold and tin in these cavities where Dr. Haskins uses non-cohesive gold.

DR. C. P. PRUYN:

Dr. Haskins has presented this subject in a lucid manner. The use of non-cohesive gold is something that I am not very familiar with, and I presume I have made a mistake in not using more of it. I shall try and use it. I presume it would be far better for my patients if I had used more of it in the past.

DR. FRANK H. GARDINER:

I dislike the use of the terms non-cohesive and cohesive gold, and for this reason: We have been taught that gold which was cohesive was soft. There is no non-cohesive gold which is absolutely soft except Abbey's gold. If you take Abbey's gold and put it into a cavity with a matrix it saves time.

DR. HASKINS (closing the discussion):

In answer to the remarks of Dr. Gardiner relative to the terms "soft" and "cohesive," they have been used and misused. But the statement made that we cannot have non-cohesive gold that is soft is a mistake. For instance, you may take a mass of cohesive gold and submit it to the fumes of ammonia and it will become non-cohesive. You can make it cohesive by annealing. The term soft in this case applies to gold which has been annealed after malleting or after rolling. Gold can be rendered harder by hammering or malleting, but made softer by annealing.

With reference to the statement made by Dr. Royce as to Abbey's and Williams' foil, I have no doubt that Williams' foil can be made cohesive after it has been subjected to the fumes of ammonia. But it is non-cohesive when it comes from them, and can be used in that manner.

In regard to one remark made by Dr. Royce, I will say that I do not carry non-cohesive foil higher than the gingival two-thirds of the cavity, which would leave a contact point of cohesive gold. I am aware that I do not get much sympathy in the management of occlusal cavities by those who are using non-cohesive gold foil. In my early practice it was not my good fortune to be associated with those who used non-cohesive foil. I have seen little of it used myself, and what little I know about it has come from working at it.

Dr. G. W. Dittmar read a paper on "The Use of Matrices."

DISCUSSION.

Dr. E. R. Carpenter:

I have only a word or two to say on this paper. I am on record as a radical matrix worker, and am glad of it. I agree with most of the contents of Dr. Dittmar's paper, but there is one point with which I desire to take issue, and that is in using a matrix in disto-proximal cavities only. If a matrix can be used in such a cavity it can be used in any cavity.

Dr. F. W. Stephan:

I wish to congratulate this society on having listened to a very excellent paper on a subject of great importance. I wish also to compliment the essayist and say that in the main, I agree with what he says most heartily.

When he says "as a rule we should make a special matrix for each individual case," I would second his statement. When he says "numerous ingeniously devised matrices were to be found on the market, most of which, when properly adjusted to certain forms of cavities, prove an invaluable aid to the insertion of fillings," I can also heartily endorse the statement. The main object of the paper, in calling attention to the necessity of using a matrix, "especially in the insertion of plastic fillings," cannot be too strongly emphasized. With amalgam, the matrix is certainly indispensable.

The essayist has described at length the construction and retention of a matrix both simple and with a wide field of applicability. In my own experience, however, I have found it seldom necessary to tie a matrix to place, having used that method only in exceptional cases where there was no adjoining tooth. To tie a matrix is more or less of a tedious proceeding, and where there is an adjoining tooth it is much more simple and quite as efficient to hold it in place with a wedge. The wedge has the advantage of gaining additional space.

A very simple matrix which I have used for some years is made of a piece of German silver or other similar metal cut a little larger than the cavity and having a flap at the occlusal edge to be bent over against the proximating tooth. This flap is designed to keep the matrix from slipping gingivally. The matrix should be contoured with pliers, and the reverse side should be roughened with lines running bucco-lingually to prevent slipping of the wedge. The wedge should be long, with gradual taper.

The construction of this matrix is considerably simplified by using matrix blanks which are merely large matrices constructed on this plan and may be obtained from some of our dental depots.

I wish here to state that in using gold or other foils, with any matrix, a pad consisting of several layers of the foil should always be placed between the matrix and the tooth. The importance of this I would emphasize, as it affects materially the value of the matrix. It has the effect of holding the matrix from the margin of the cavity, thus allowing free access; of protecting the margins from fracture, and, by folding that portion of the pad within the cavity over and against the gingival wall, it forms the first layer of the filling, perfectly and easily covering the gingival margin.

I cannot conscientiously pass the subject of matrix forms without calling attention to one form of band matrix, namely, the Lodge band matrix. It is the only band matrix that I know of that is constructed to naturally shape itself to give proper contour to the filling. It is neat, stands out of the way of the operator, is simple in mechanical construction, and I find it invaluable in many cases, especially where there is no proximating tooth.

In speaking of the matrix for the insertion of cement, the essayist speaks of coating it with a thin film of vaseline or some oil to prevent sticking of the material. This should always be done. In this connection I would call attention to the use of a matrix for this purpose made of a strip of photographic film. The strip should be held around the tooth and the cement packed into the cavity as the essayist has described, the advantage being that the film is transparent and we can see the filling as it progresses. It is also flexible, and may be burnished against the filling and leaves a smooth and polished surface with perfect margins.

Considering the matrix with gold, the essayist rather discourages its use. He has relegated it entirely to difficult cavities in disto-occlusal surfaces in molars, or occasionally, perhaps, to similar surfaces in bicuspids. In these cases it is certainly invaluable. However, I must differ from him in confining its use to these cavities only. In my experience the matrix is indicated wherever it will not interfere with the view of the cavity, and its advantages will sometimes even overbalance a certain amount of disadvantage in that respect.

In mesial cavities, where the operator can easily get a clear view of the field of operation, I have used the matrix with decided advantage, and only in mesial cavities where the access is difficult and where the matrix would materially obstruct the view, do I consider that the disadvantages of its use overbalance the advantages.

My reasons for wishing to use the matrix in these cases are: first, the matrix, in a manner, converts a complex cavity to a simple one, thus allowing the use of soft gold, tin and gold, or tin foil, which can be worked with exceeding ease and rapidity. Should the matrix not be used, it necessitates the building of the filling entirely with cohesive gold by the slow piece by piece process, so tedious to both operator and patient. The cutting down of time and the saving of backache to the operator are certainly important items.

Second, with the matrix to guide the operator, perfect contour can be obtained more easily than when he must depend upon his specially acquired skill to build to the exact form. It is a fact that only our most skillful operators can begin to compete with the matrix in the accuracy of building to proper contour without having great surplus. With regard to perfection of condensation and adaptation to margins there can be no question.

Third, where the matrix is used the finishing process is very simple, requiring but a few rubs of a medium grit strip.

With regard to the preparation of the cavity, I fully agree with the essayist that the cavity should be shaped just as it would be were no matrix to be used, with the possible exception that the retention at the gingival end need not be quite so great.

In conclusion I wish to again speak of the necessity of the matrix with plastics and to emphasize its great value when using gold and its combinations.

Dr. W. G. Clark:

My first experience in the use of a matrix was with a broken separating file. Following this, during a period of several years, I experimented with the various forms obtainable.

The result of my clinical experience has led to some conclusions, namely, that instead of using the instrument for the purpose of supplying the missing wall of the cavity, it should be used as a guide in building the line of contour, and that the direction of the force applied to the filling material should be toward the solid tooth substance, away from the matrix or parallel with it, but never directly against it. Also, that the first part of the filling next the gingival wall (I am speaking now of gold fillings) should be of soft gold or tin foil, placed in position to cover the gingival portion, beyond the angles and partially condensed before the matrix is adjusted. The appliance that, in my hands, seems to more nearly meet the requirements is a simple piece of sheet steel, with a polished surface, cut to fit each individual case, and held in place by a wooden wedge at the neck of the tooth.

For use in plastic fillings I am in favor of a matrix made of celluloid, the edge next the gum bent twice to form acute angles, this taking the place of a wedge or other means of support. No attempt is made in either case to bend to the shape of the tooth. These appliances may be used for any anterior or posterior proximal cavities back of the cuspids, where the adjoining tooth is in position. If the cavity has been prepared according to modern, and I think generally accepted methods, it will be readily accessible in all its parts, including every portion of the margin.

I have not had an opportunity to try the special form of matrix described by the essayist, but it would seem to me that it would be difficult, if not impossible, to flatten the rough surface of the end with pliers, so that the surface of the filling is not disturbed. I think, as a rule, to which there are some exceptions, it is not necessary or desirable to use a matrix for any cavity where the proximating tooth is absent.

DR. V. H. FUQUA:

I want to go on record as saying that I believe in the use of the matrix in almost all proximal cavities, either filled with gold, amalgam or cement.

The paper was further discussed by Drs. L. H. Arnold, W. C. Davis, F. E. Burnett, all of whom used the blackboard freely for purposes of demonstration in connection with their remarks.

DR. DITTMAR (closing the discussion):

I have but little to say in conclusion. With reference to the use of the matrix for the insertion of gold fillings, I stated that it should not be applied to mesio-occlusal cavities. My reasons for this, as I suggested in the paper, are that a matrix so placed obstructs the view of the operator and prevents the application of properly directed force, especially that which must be applied to the gold covering the buccal and lingual cavity margins.

For disto-occlusal cavities, especially in molars, I can well see the advantage of a well-adjusted matrix. It will not obstruct the view of the field of operation, and does not in a material way interfere with the proper application of force, while it does greatly assist in the placing of the gold and its retention in the cavity, especially when starting a filling. It also controls the contour while building a filling.

THE SOCIETY OF DENTAL SCIENCE OF ST. LOUIS.

NOVEMBER MEETING, 1903.

DISCUSSION OF PAPER BY C. N. JOHNSON, OF CHICAGO.

DR. A. H. FULLER:

Since my attention has been given to the study of dentistry the subject of dental caries and everything connected with it has been of the greatest interest to me. The different theories advanced to account for the disease—from the time of Hippocrates to the present—would certainly impress us with the fact that its solution has not been an easy matter. Among those who have contributed to the literature on this subject, we might mention Fauchard, Bourdet, Hunter, Fox, Bell, Robertson, Deserabode, Ficinus, Klenke, Neuman, Herz, Tomes, Magitot, Leber and Rotenstein, Underwood and Miles, Wedl, Bridgeman, Watt, Heitzman, Miller, Williams and others; all of whom have accomplished something in connection with its better understanding.

Relating to the subject of the paper which we have just listened to, I think the work of Magitot, published some thirty years since and translated by Prof. Chandler of the Harvard Dental School, gives us more information than any other work that I know of.

He says: "It is well known that in France a bad condition of the dental organs constitutes a cause of exemption from military service—at the age of conscription—twenty. The statistics of the War Office should afford us valuable information," which he gives in a table published on pages 75 and 76 "Magitot's Dental Caries."

This table shows the comparative exemptions from military service from imperfect denture by departments from 1837 to 1849 inclusive (thirteen years), in every 100,000 examined, in the eighty-six departments of France. These exemptions run from 36 in one department to 6,760 in another, or from 36 to 186 in the first eighteen departments mentioned, and from 1,000 to 6,760 in the last eighteen given in the table.

He also gives a chart marking the departments *black* where the most exemptions were found and *white* where the least were given, and the intermediate departments an intermediate shade. He shows the habits of the people to be about the same, drinking the same water, wines and beer, and eating the same fruits, meats, vegetables, etc.

He shows further that the departments most affected are peopled by the descendants of the Cymric invasion, who flooded Gaul some six hundred years before Christ. Those least affected are descended from the Celts, which includes the region of Brittany. The one, a large blonde people with defective dental organizations; the other, short, stocky, with good teeth.

A chart prepared by M. Broca giving statistics for exemption from military duty on account of size is white where Magitot's is black, and black where his is white. Much other information is given on the subject, but what I have mentioned is to me evidence that goes a good ways toward showing that predisposition to dental caries is an inherited tendency, possibly aggravated by habits, also transmitted, and that immunity is also an inheritance modified in the same way.

The knowledge of the profession and the public regarding this subject would be much greater were we not flooded with numerous works written by persons who have more *time* than *practice,* and all agreeing that the mode of living at present tends to defective dental equipment.

The report made by a committee appointed by the American Dental Association and published in the transactions of 1893, pages 158 to 187, show that the autochthonous inhabitants of both North, Central and South America were subject to the ravages of caries to the same or greater extent than the present inhabitants of the United States.

South Americans, including Peruvians and others, of 6,719 teeth examined, 2,462 were diseased, or 36 3-5 per cent. North American tribes, 27,362 teeth were examined and 5,811 found carious, or 21 1-15 per cent. In the South American skulls cysts showing that abscesses had occurred in 511 cases, and in the North American crania 1,069 cysts showing abscess were found. In the grand total of teeth examined in prehistoric crania there were 46,017 teeth examined and 11,338 affected by caries.

The above mentioned reports show that we must look to something besides civilization to account for decayed teeth, and something besides use of the jaws to prevent caries.

Dr. Miller's investigations have helped us greatly. Dr. J. Leon Williams may help us still more. The appearances we find in mouths at different times are as stated by the essayist, but many times the conditions can be modified by the patients themselves. Immune periods are controlled by the patient in many cases. The articles by Dr. Smith of Philadelphia and Dr. Taylor of Hartford, Conn., on tooth and gum massage help bear out the above statements. We, in many cases, inherit a predisposition to caries of the teeth and in most cases procure immunity by careful attention to them.

DR. EDWARD H. ANGLE:

I want to take a little exception with my friend Johnson here in regard to the structure of the teeth as shown in these diagrams. I never could quite make up my mind to believe the statement, brought up first by Dr. Black and repeated by Dr. Johnson tonight, relative to there being no difference in the structure of the teeth as regards their immunity. In other words: the tooth that is very hard is no more immune from decay or caries than what we call a soft tooth, and that there is no difference really, in the structure of teeth, between the hard and the soft, only in the arrangement of the enamel rods. This may be true, but it does not seem reasonable. I have a very vivid remembrance of the structure of teeth, as all dentists must have. Certainly there is a very great difference between what we call the hard and the soft teeth, and I cannot help but think that the soft teeth are more perishable than the hard teeth. I have examined a great many specimens of enamel and have prepared a great many specimens, and have found that the enamel rods are very regular and the only rods like the diagram are in the manitee or sea cow and in the porcupine. There is very little difference in the human enamel. I believe that if we could strip the enamel from the soft teeth and from what we call the hard teeth we should find it actually heavier, and the other really and truly softer, more porous, more perishable, less resistant to caries than the harder tooth. There is another question. For same reason or another I believe malocclusion is the cause or condition which makes the teeth immune to decay. I know that is contrary to all the books, but take 500 patients who have malocclusion of the teeth and 500 whose teeth are free, and I am positive that there will be far less caries in the patients who are subject to malocclusion. I have noticed in certain classes of malocclusion, especially in the mouth-breathers, that they are remarkably free from caries.

Dr. Gibson:

Whatever we may know about the susceptibility to decay in human teeth or the immunity from decay, we as dentists—who are the servants of the people—know that the patient who takes the best care of his mouth, from a prophylactic standpoint, has the least decay, and it becomes our duty as professional men to spend a great deal of time in instructing our patients how to care for their teeth.

Dr. I. B. Howell, of Paducah, Ky.:

Last August I saw a tooth in Dr. Black's mouth, decayed twenty years ago, in which the decay was arrested and the tooth was now apparently hard and sound. He became immune from caries twenty years ago and has been immune ever since.

President Windhorst:

About four years ago two ladies came into my office, one 54 and the other 48 years of age. One of them had a point broken off a lateral incisor; and, after polishing down this broken point, the elder one said: "I wish you would look at my teeth and see if they need cleaning." I never saw a set of such beautiful, perfectly clean teeth! I asked her what brush she used and what dentist she went to. She said: "Why, Doctor, I have not used a brush or been to a dentist since I was 12 years old." She used dental floss altogether. They bought it, not by the spool, not by the dozen, but by the *gross* in that family. Absolute immunity from decay by perfect cleanliness. In reference to the curved enamel rods: Why do we find all classes of timber with that same condition? We find all white oak straight, and we find the lines all waved in the soft maple. We find that where the teeth are worn down, the very moment when you pass through the outer crust, the enamel, your instrument goes down just as though it goes into wax. Therefore we may reasonably believe that such enamel does exist—enamel with curved, twisted rods, the surface being so hard that, as Dr. Johnson says, you almost strike fire.

Dr. B. E. Lischer:

Dr. Angle made the remark that if we were to strip the enamel from a tooth that was seemingly perfectly formed, and also from one imperfectly formed, we would in all probability find a difference in every way; one would be porous and one would not be porous, etc. Dr. Black in his researches (*Cosmos,* 1895), found the total fluctuation of lime salts at any given age in the teeth from one hundred and eleven (111) mouths examined to equal 2.28 per cent; the fluctuation at all ages, 4.69 per cent; the total difference in specific gravity .096 of one volume. Dr. Williams, at the conclusion of his notable experiments, is of the opinion that with our present facilities we are absolutely unable to detect any difference whatsoever between the enamel from a freshly extracted tooth and that which has been buried in the earth for countless centuries; such as we might procure from the teeth of the extinct mastodon. He tells us (*Cosmos,* 1896) that, "Enamel is a solid mineral substance," and we know full well that after its complete formation and after the consequent eruption of a tooth, its source of nutrition is removed.

But in justice to Dr. Black, let us remember that he admits of a possible difference, and only lays especial emphasis upon this one important fact, viz., that this difference in the fluctuation of lime salts is practically *nil* in comparison to the difference in immunity and susceptibility as found in different mouths.

(Dr. Lischer here exhibited a card of mounted teeth, showing malformed incisors and cuspids from several mouths, some of which were extensively decayed, owing to the pits and their poor structure in general which favored the lodgment of food debris, and others equally as poor in structure, but which showed not the slightest trace of caries).

This subject, which has been so ably presented by Dr. Johnson tonight, is but the groundwork upon which rests that other very important basic principle of operative dentistry, and with which his name is so intimately associated, viz., "extension for prevention." What occlusion is to orthodontia, extension for prevention is to operative dentistry or the art of filling teeth.

I confidently believe that the solution of this question will ultimately resolve itself into a thorough study of the human saliva and its flora; in other words, the environment.

"Miss Mary S———, aged 20, daughter of the Hon. Wm. S. ———, of Ohio, came to Wheeling in the spring of 1848, to obtain relief from the effects of a very severe burn, which she had received some 15 years before. The burn was principally confined to the neck and lower part of the face, and its cicatrix produced a deformity of the dreadful character. Her head was drawn downward and forwards, chin was confined within an inch of the sternum, the underlip was so pulled down that the mucous membrane of the left side came far below the chin, the under jaw was bowed slightly downward, and elongated, particularly its upper portion, which made it project about one inch and three-eighths beyond the upper jaw. In front there was scarcely any appearance of either skin or neck. She was unable to turn her head to either side. The cheeks and upper lip were dragged considerably downward; she could not close her eyelids; she could not close her jaws but for an instant, and then only by bowing her head forward. She could not retain her saliva for a single instant; and, as might be expected, her articulation was very indistinct.

"She had been taken to the city of New York some years before for the purpose of being relieved from this deformity, and was placed under the care of two of the most distinguished physicians in that city, who performed an operation by dissecting up the cicatrix on the neck, then raising the head and sliding up the cicatrix from its original position, leaving a raw surface below to heal up by granulation. I need scarcely add that the operation was entirely unsuccessful.

"After a careful observation of the case, it became evident that such a complicated deformity could be best remedied by performing three separate operations: one upon the jaw, another upon the neck, and third upon the under lip.

"To remove the projection of the under jaw, seemed to require first attention. Unless that could be done the other operations, however successful, would add but little, if any, to the personal appearance of the patient. The lengthening of the jaw had taken place entirely between the cuspidatus and first bicuspid tooth of the right side, and between the first and second bicuspids of the left. By the elongation, the teeth just described were separated on both sides about three-fourths of an inch.

"To saw out the upper edge of these elongated portions of the jaw, and then to divide that part of the jaw in front of the spaces thus made, by sawing it through in a horizontal manner, so as to permit the upper and detached portion to be set back in its original position—appeared to be the only possible way of remedying the deformity. This plan I therefore adopted, and performed the operation on the 12th day of June, in the manner now prescribed.

"The operation was commenced by sawing out, in a V shape, the elongated portions, together with the first bicuspid on the left side, each section extending about three-fourths of the way through the jaw. I then introduced a bistoury at the lower point of the space from which the section was removed on the right side, and pushed it through the soft parts close to and in front of the jaw, until it came out at the lower point of the space of the left side. The bistoury was then withdrawn, and a slender saw introduced in the same place, and the upper three-fourths of the jaw, containing the six front teeth, was sawed off on a horizontal line ending at the bottom of the spaces before named, the detached portion being still connected on the outer and inner side, to the jaw below, by the soft parts.

"After having with the bone nippers removed from the detached portion the corners which were created by the horizontal and perpendicular cuts of the saw, it was set back, so that the edges from which the V-shaped sections were removed came together.

"Thus it will be perceived that this portion of the jaw and teeth, which before projected and inclined outward, now stood back and inclined inward, and in its proper and original place.

"In this position the jaw was secured, by passing ligatures around the cuspidati in the detached portion and the now adjoining bicuspids in the sound portion, then taking an impression of the jaw in very soft wax, a cast was procured, and a silver plate struck up and fitted over the teeth and gum in such a manner as to maintain the parts in that same relation, beyond the possibility of moving.

"The patient declared that the operation gave her little or no pain. There was a little swelling about the chin during the first three days after the operation, but not the slightest uneasiness. In this way the case progressed; the gum healed in a few days, the jaw united strongly and in the time bones usually unite, and the wearing of the plate was discontinued within six weeks after the operation was performed."

DOMESTIC CORRESPONDENCE.

To the Editor of the DENTAL REVIEW:

Dear Sir:—On page 261 of the March issue of your esteemed journal you published a letter by Professor Harlan in regard to the first use of plaster of paris for taking impressions of the mouth, in which he intimates that it was first used in 1823 by some dentist in New York or even prior to that period. In the German dental literature we find some interesting data concerning this matter. Mathias Gottfried Purmann, of Breslau, Silesia (1648-1721), advises the use of wax for impressions; he does not, however, speak plainly about a plaster of paris model obtained from such impressions. In 1756 Philipp Pfaff, a celebrated German dentist, published a work entitled: "Treatise on the Teeth of the Human Body and Their Diseases," in which he distinctly outlines the use of wax impressions and the casting of models with plaster of paris. From that time on the terms, "Gypsabdruck" and "Gypsmodel" (plaster of paris impression and plaster of paris model) are found in current German dental literature. If Pfaff did not state in his work that he took impressions with plaster of paris, he certainly gave the incentive to do so.

Professor Harlan refers further to the use of metal dies to swage gold and silver plates upon by the same dentist. In regard to the first use of metal dies the Frenchman, Laforgue, refers to a letter of the celebrated French-American dentist, Gordette, written in 1804, in which he speaks of swaging gold plates between metal dies; he says: "Il estampe sur eux les plaques d'or, ce qui lui reussit. Ja le crois." (He stamps between them the gold plates, until he succeeds. I believe him.)

Respectfully yours,

HERMANN PRINZ.

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, THE DENTAL REVIEW, 55 State Street, Chicago, Ill.]

Relieving Pain After Setting a Crown or Bridge. — The pain caused by setting a crown or dental bridge may be alleviated almost instantly by the free application of Campho-Phenique upon the gum.

H. A. CROSS, Chicago.

Cleansing Crowns, Bridges or Gold Appliances After Removal. — Place them for a short time in a saturated solution of sodium dioxid. This will destroy the offensive accumulations usually presented in such cases and renders them aseptic and easy to polish.

WILLIAM C. SMITH, Pasadena, Cal.

To Control Hemorrhage After Extraction. — Where the usual local treatment fails the following has been found to produce good results. To one-half a glass of water add three grains of tannic acid. Give of this two teaspoonfuls with fifteen drops of fluid extract ergota every five minutes until three doses have been given, after which repeat the dose every fifteen minutes until the hemorrhage ceases. This, however, should not be given to women during pregnancy.

W. S. WALTERS, La Fayette, Ind.

Method of Preparing Carbonized Cotton. — With very little trouble any dentist can prepare carbonized cotton, so valuable in the treatment or filling of root canals. Secure a piece of gas pipe about three-quarters of an inch in diameter and four inches long. Each end should be threaded so that caps can be easily adjusted. The cotton should be well saturated in boric acid and packed tightly into the pipe, after which the caps can be screwed on. Place the pipe in a stove or under the flame of a blow-pipe until the cotton is reduced to carbon.

CLARENCE C. COY, Iola, Kansas.

Forming Wax Trial Plates. — When wax trial plates are placed in the mouth care should be taken that the edges conform to the plate line as the finished denture is required. This can be determined by drawing the buccal muscles tense, with the fingers inserted into the mouth, and in lower cases by requesting the patient to raise the tongue to the palate, while the trial plates are in position. The wax should be trimmed so that the movement of the muscles will not force the wax plates out of their correct position.

J. A. Bullard, Chicago.

To Prevent Melotte's Metal from Becoming Brittle. — If whiting (calcium carbonate) is used as a separating material in making dies and counter dies with Melotte's metal, it should be thoroughly removed before the metal is remelted. The heat in fusing breaks up the carbonate radical of the whiting and lime (calcium oxide) is formed, which, if incorporated in the alloy, makes it brittle. The lime can be chemically and easily removed by dipping the ingot in dilute hydrochloric acid (10 per cent). This will convert the lime into soluble calcium chloride and the soluble salt can be thoroughly washed off with water.

J. P. Buckley, Chicago.

Repairing a Rubber Denture. — When one or two teeth are broken they can be easily and quickly replaced in the following manner: Select teeth that will fit perfectly in their proper position on the plate. Cut a cavity, dovetailed in shape, in the rubber back of the pins, being careful not to cut through the plate. Fuse Melotte's alloy and drop small pieces on an asbestos pad. Hold the plate firmly with the left hand, the index finger pressing against the tooth or teeth to be secured. Place the small pieces of Melotte's alloy in the cavity and with a hot wax spatula they can be partially fused and pressed around pins of teeth and into the cavity. This method is quicker and better than amalgam for the same purpose and I have used it several times with much satisfaction where the patient was unable to leave the plate long enough to repair by vulcanizing.

J. P. Buckley, Chicago.

A Method of Serrating Plugger Points. — Select a metal file with serrations as fine as the plugger point is desired when finished. Place the file in a vise and secure it in such a way that free access can be gained to the portion at the posterior part, near the handle, where the cuts cease to cross, and in consequence parallel serrations are presented. Prepare a plugger point the desired size and shape, adjust it in a pin vise and with the end of the plugger placed firmly against the file at the point indicated it can be worked back and forth in the direction of the cut until the plugger presents serrations as deep as required. Repeat at right angle if cross-cut serrations are desired. It may be necessary to draw the temper from the plugger point to gain the best results, but this can be restored with little trouble in the usual way.

By this method plugger points which are adapted to the manipulation of fibre golds can be very easily formed after a little experience and if care is taken to select the proper file there will be no difficulty. To prove this compare other points under a lense.

R. L. GRABER, Peoria, Ill.

MEMORANDA.

KENTUCKY STATE DENTAL ASSOCIATION, annual meeting, Bowling Green, May 25, 26 and 27, 1903. G. R. SHACKLETTE, Sec.

THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS will meet at Asheville, North Carolina, July 24, 25 and 27, 1903. J. P. ROOT, Sec.

COLORADO STATE DENTAL ASSOCIATION.

The seventeenth anniversary meeting of this society will be held in Denver, Tuesday, Wednesday, and Thursday, June 16, 17 and 18, 1903.

FRANK Y. HERBERT, Chm. Ex. Com.

MAINE DENTISTS.

As a native of Maine, I would be glad to secure the name and address of dentists who are natives of that state, the reason for which I would communicate to them. L. P. HASKELL.

THE KANSAS STATE DENTAL ASSOCIATION.

The thirty-second annual meeting of this association will be held at Emporia, Kansas, on the 14th, 15th and 16th of May.

GEO. A. ESTERLY, Sec.

THE E. K. WEDELSTAEDT DENTAL CLUB OF IOWA will hold its next meeting at Clear Lake, Iowa, July 7, 1903.

THE KANSAS STATE BOARD OF DENTAL EXAMINERS.

Will meet at Kansas City, Kansas, May 4, 5, 6, 7 and 8, 1903. The examination will be theoretical and practical. Applicants must provide their patients, instruments and materials, and be prepared to construct a plate and crown, insert an amalgam, gold and cement filling. The theoretical examinations will be the same as usually given at such times.

J. P. Root, Sec.,
Kansas City, Kansas.

ILLINOIS STATE DENTAL SOCIETY.

The thirty-ninth annual meeting of the Illinois State Dental Society will be held at Bloomington May 12, 13 and 14. A large program of interesting essays and clinics has been prepared, and a splendid meeting is expected.

The railroads throughout the state and from St. Louis will make a rate of a fare and one-third, certificate plan, for the round trip. All are cordially invited. Remember the date.

Hart J. Goslee, Sec.
A. H. Peck, Pres.

THE MISSOURI STATE DENTAL ASSOCIATION.

The thirty-ninth annual meeting of this society will be held at Kansas City, Mo., May 19, 20 and 21. Reduced railroad and hotel rates have been secured and a very large attendance is assured. A number of dentists of national reputation, among them Drs. J. B. Willmont, Toronto, Canada; E. K. Wedelstaedt, St. Paul, Minn., and A. C. Searl, Owatonna, Minn., will present features and give clinics. All ethical members of the profession are cordially invited to attend, become members and take part in the discussions.

Otto J. Fruth, Cor. Sec.

The Eastern Indiana Dental Association will hold its annual meeting at Elwood, Indiana, May 12 and 13, 1903.

Efforts are being made to have a large and profitable meeting. Prominent members of the profession will present papers, and the clinics will be of especial interest.

All members of the profession are cordially invited.

P. H. Chadwick, Sec.

RECENT PATENTS OF INTEREST TO DENTISTS.

721,528. Rack for holding false teeth. Ormond E. Wall, Honolulu, Hawaii.

721,655. Tooth regulator. Edward H. Angle, St. Louis, Mo.

722,033. Dental clamp. Wm. A. McCarter, Topeka, Kans.

723,134. Automatic mallet. Arthur W. Browne, Princebay, N. Y., assignor to S. S. White Dental Mnfg. Co., Philadelphia, Pa.

723,135. Sleeve for flexible shafting. Arthur W. Browne, Princebay, N. Y., assignor to S. S. White Dental Manufacturing Co., Philadelphia, Pa.

722,699. Tooth-powder box. Wm. H. Hall, New York, N. Y.

722,726. Dental flask press. Theodore G. Lewis, Buffalo, N. Y.

722,765. Dentists' flask. Andrew S. Steigerwald, Philadelphia, Pa.

723,102. Artificial tooth. Thomas H. Whiteside, Youngstown, O.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

Obituary.

DR. S. B. PALMER.

The following notice sent to the dental profession announces the death of one of the best known and best beloved practitioners in the East:

March 31, 1903.

"Dr. S. B. Palmer of Syracuse, N. Y., died last night after an illness of three weeks following his retirement from active practice. The funeral will be on Thursday morning at 11 o clock in the First Presbyterian Church. The body will lie in state there from 9 to 11 o'clock. The dental profession will attend the funeral in a body, meeting at the rooms of the Chamber of Commerce in the University Block at 10 o'clock.

Yours truly,

Charles H. Barnes.

President Fifth District Dental Society."

DR. SAMUEL GRANT GROVE.

Died at St. Luke's Hospital, Cedar Rapids, Ia., Feb. 22d, 1903, from burns received in the Clifton Hotel fire in that city Feb. 20th, 1903. Samuel Grant Grove was born near Chambersburg, Pa., April 2d, 1868. He came west to Sterling, Ill., in 1889 and in 1893 began the study of dentistry with his brother, Dr. W. A. Grove, at Tipton, Ia. Following this preliminary training he entered the Northwestern University Dental School, Chicago, Ill., and graduated there with his class in 1896, and began the practice of his profession in Cedar Rapids, Ia. He was kind hearted, genial and popular, and his abilities won for him a large and select practice.

He united with the First Christian Church of Sterling, Ill., was a member of the Iowa State Dental Society, the Northern Iowa Dental Society, and a charter member of the Cedar Rapids Dental Society; also Crescent Lodge A. F. & A. M., and Eastern Star orders. His three brothers and three sisters survive him, and together with his hosts of friends deeply mourn his untimely and sad death.

THE

DENTAL REVIEW.

VOL. XVII. CHICAGO, MAY 15, 1903. No. 5

ORIGINAL COMMUNICATIONS.

THE SALIVA AS AN INDEX OF FAULTY METABOLISM.*

BY EDWARD C. KIRK, D. D. S., SC. D., PHILADELPHIA, PA.

MR. PRESIDENT AND GENTLEMEN:

The matter to which I have the pleasure of asking your attention this evening is a consideration of some aspects of the process of nutrition in the human body, and particularly some aberrations from the normal nutritive processes which I believe to represent what has been called the constitutional factor or predisposing cause of some of the local disorders which as practitioners of dentistry we are called upon to treat.

In the study of the metabolic processes of the animal body whereby the ingested food stuff is converted to the uses of the organism, considerable information as to the nature of the process at a given period may be derived from an investigation of the waste products produced by the chemico-vital process through which the pabulum has passed. The chemist by an examination of the products of combustion from a furnace can form a fair idea of the nature of the fuel used and learn something of the intensity of the process, the perfection of the combustion, the relative proportion of draft to fuel, and obtain not a little idea of the efficiency of the furnace itself, that is, determine its functional value as it were.

The comparison of the animal organism to an engine for rendering kinetic the potential energy of fuel is not inapt and has been frequently used as an illustration of certain basal vital phenomena of the animal body.

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*Read before the Fifteenth Anniversary Celebration of the Odontographic Society of Chicago, February 16th, 1903.

In the study of cell metabolism we are at once confronted with problems which, though extremely complex, are nevertheless becoming more and more clear through the discovery that the fundamental principles of chemism and molecular physics are found to ultimately apply to the phenomena of cellular nutrition and growth even though these are profoundly modified in their expression by the as yet unexplained factor of vitality inherent in living substance.

It is known, for example, that all living cells with possibly a few exceptions, require oxygen for the performance of their vital functions, hence notwithstanding the complexity of the chemical changes through which the pabulum required for the nutrition of the cell may pass, we are safe in concluding that oxygen is necessarily concerned in the process of cell nutrition, which is therefore in some stage or degree a process of oxidation or combustion of cell food. We know also that this vital combustion process, like that of the engine furnace, results in the production of heat, mechanical energy and waste products, and further in order that the highest efficiency measured in terms of functional activity shall be attained that not only must the proper kind of pabulum be available by the cell, but in order that we may have a theoretically normal metabolism there must be maintained a correct adjustment between the amount of pabulum which the cell can utilize and the quantity of oxygen needed for its combustion. Or, as stated by Professor Verworn, of Jena, (General Physiology, page 141) · "All organisms take only a certain quantity of oxygen even when more is offered, their consumption of it is not essentially increased in a medium of pure oxygen. Hence, within certain limits living substance is fairly independent of the quantity of oxygen at its disposal but all organisms, without exception, require for their life a certain quantity of oxygen."

The analogy between the nutritional process and the combustion phenomena of the engine furnace falls short in at least one important particular which distinguishes the metabolic vital processes from that of the inanimate machine, viz., the process of combustion of fuel is essentially simple in character and consists either in the reduction of complex compounds to simpler forms of combination or in the case where the fuel is elementary in character, as in the combustion of carbon, the new compounds formed are of extremely simple constitution while in both instances they are results of direct oxidation.

In the complex system of molecular changes which we group together under the term cell metabolism two distinct phenomena appear to follow the initial oxidation process, first the building up of atomic groupings into compounds of the highest order of complexity—the proteids for example, and second a reduction of a portion of the protoplasmic contents to compounds of simpler constitution.

The process of metabolism is therefore both synthetic and analytic, but as in the case of ordinary combustion the metabolic process is also absolutely dependent upon a proper supply of oxygen, which element must be regarded as the initiative of the subsequent series of protoplasmic changes involved in the metabolic process upon which all that may be included in nutrition depends.

The introduction of oxygen into the protoplasmic combination through the agency of the hemaglobin of the blood disks inaugurates a series of alterations in the protoplasmic mass, reconstructing it in various ways in the course of which its several vital phenomena are manifested.

I wish to avoid the creation of an erroneous impression in this connection, viz., that all of the metabolic changes in living cell substance are simply cases of oxidation, on the contrary we can safely attribute to oxygen only the power to initiate the complex series of chemical changes and cleavages which follow its combination with the protoplasmic mass. The subsequent cleavages of the mass in those directions which are necessary to normal metabolism, though initiated by oxygen, are by no means continued as oxidation processes. Oxygen, as it were, sets the metabolic process in motion, or as stated by Professor Michael Foster, 'oxygen winds up the vital clock." (Human Physiology, p. 368.)

In the process of metabolism the cell pabulum undergoes a variety of complex chemical changes which for our present purposes it is unnecessary to follow, but in general we should note that its constituent elements are rearranged into new combinations whereby two important functions of the organism are served, viz., first the production of those factors, physical, chemical and histological, necessary to the vital maintenance and growth of the organism and second the elimination of those factors unnecessary or hurtful to the organism.

Investigation has tended to more and more clearly establish the fact that has *a priori* for a long time been accepted, viz., that the nutritional process is distinctly within the range of phenomena involving the application of those great generalizations of science dealing with all molecular activity, the conservation of energy and correlation of force. And further when we come to study the chemical transmutations of the protoplasmic mass which are involved in the nutritional process we find that the law of definite ratios in the formation of new combinations applies to the chemistry of the cell as it does to chemical changes in general.

In any attempt therefore to conceive of a theoretically normal standard of nutrition we are compelled to take these data of molecular physics and chemistry into account. In fact it is only by their aid that a good working conception of nutrition is possible, so that in the light of these general data we may say for our present purposes that nutrition is theoretically normal when the metabolic processes of a cell are so adjusted with regard to the conversion of cell pabulum as to develop the highest vital efficiency of the organism. This involves among other things the proper kind and correct amount of cell food, both of which in the first instance must be definitely proportioned to the capacity of the cell to utilize oxygen. Any lack of normal adjustment in these fundamental factors will create a defect in metabolism as quickly and certainly as a lack of correct adjustment between the draft and fuel will cause imperfect combustion in a Bunsen burner, for example.

It is the consideration of the vital phenomena flowing out of the interaction of the data referred to that constitutes the field of physiological study, but as we are confronted with multitudinous variations from the ideal conditions of nutrition we have for the sake of convenience in classification assigned to these variations a special designation, viz., that of pathology, yet in the last analysis both classes of phenomena are essentially the same, their differences being those of kind and degree of metabolic activity.

The question of cell type as determining the nature of metabolic changes is important and interesting, for in the impress of heredity upon the cell protoplasm by which its activities are limited to the performance of certain classes of metabolic changes is involved the explanation of those inherited tendencies to disease which we call diathetic. But inasmuch as we may safely assume that the diathetic state before its transmission was originally acquired through a cell environment in which normal metabolism was permanently disturbed, we must recognize diathetic states which are acquired as well as hereditary and we know as a matter of clinical observation that these acquired diatheses do occur as the result of nutritional errors in the kind or amount of food ingested when disproportioned to the cell capacity for the oxygen required to maintain a normal nutritional standard.

Michaels, of Paris, in his study of diathetic states, and following the classification of Gautrelet, recognizes two grand divisions of abnormality in the nutritional process, the first in which the oxidations are in excess of normal termed the *hypoacid* diathesis, and second, that state in which the oxidations are less than normal, termed the *hyperacid* diathesis, the normal nutritional state being adiathetic. The diatheses are the prodromal states of active disease, the conditions of susceptibility, and they determine largely the character of the subsequent invasion or disease process.

Following Gautrelet, Drouin and Hugounenq, Michaels states that the hypoacid diathesis is the state of lympathism, an expression of vital overactivity in which the oxidations are over active and the hydrations superior to normal, hence there is a decrease in organic acidity and an increase of saline chlorids excreted from the economy —"hypoacidity favors chemical changes in the tissue" (Duclaux) and the hypoacid individual is susceptible to contagious diseases (tuberculosis, syphilis, etc.). It is also the diathesis in which tooth caries is most manifest.

The hyperacid diathesis is the diathesis of arthritism and its nutritional processes are characterized by incomplete oxidation with as a consequence the formation of acid salts as end products of metabolism. Hence in this diathesis organic acidity is high. The hyperacid diathesis is characterized by slowness in the biochemical processes of cell metabolism, the irritative acid end products eventually producing pathological manifestations such as gout, rheumatism, sclerosis, etc., and incidentally certain local dental and oral lesions such as chemical erosion of the teeth and probably predisposing to certain forms of phagedenic pericementitis.

It is important for the clear understanding of the succeeding portion of this discussion that the difference between the hypoacid and the hyperacid diathesis should be borne in mind and especially the difference in the intensity of the oxidation processes as the basis of distinction between them.

Inasmuch as these diathetic states have been found to give rise to different groups of disease phenomena it becomes important that we should know all we can of the nutritional processes which in diathetic individuals are really prodromal to the disease phenomena which these cases manifest, and which are found to be in fairly constant relation to a given diathetic state.

The light thrown upon this question by examination of the excretions and heretofore especially of the urine, has contributed much to our knowledge of the nutritional process not only in health, but in disease and in the latter constitutes in intelligent hands one of the most important means of diagnosis.

Study of the composition of the urine has given us a knowledge of the nature of the waste products of the nutritional process and by inference therefrom we have learned much about the metabolic changes of which these waste products are a result.

Dr. Joseph Porter Michaels, in several communications, but particularly in his paper presented to the Third International Dental Congress held in Paris in 1900, has directed attention to the importance of the saliva as furnishing a reliable means for the study of nutritional states and particularly emphasizes its value as a means of diagnosis of diathetic conditions. Michaels contends that the composition of the saliva more accurately represents that of the blood plasma than does the urine for the reasons, first, that it is a secretion which is not modified in any important particular by the glands which separate it from the blood as is known to be the case with the urine; second, the saliva, while it contains excrementitious substances is also a digestive fluid which ordinarily is swallowed as soon as it is separated from the glands which secrete it and so passes a number of times through the nutritional cycle, in doing which it picks up fróm the blood stream those soluble crystallizable compounds which are end products or by-products of metabolism and which are dialyzable through the buccal glandular apparatus into the mouth cavity.

Accepting these premises as trustworthy, Michaels' deduction that the composition of the saliva varies with the nutritional state is a necessary corrolary and the theoretical deduction has been amply borne out by laboratory and clinical investigation.

Two important generalizations are the outgrowth of the basal principle just stated, first, that the composition of the saliva is fairly constant for a given diathetic state, second, that it is also fairly constant for any period in a given diathetic state. We are, therefore, able from an examination of the saliva to determine with reasonable accuracy not only the general diathetic condition but the period of the diathesis, i. e., whether it be weak or advanced in its pathologic intensity.

The technique of salivary investigation in order to arrive at a complete understanding of the properties and composition of saliva in all of its diathetic variations is necessarily elaborate. It involves the study of the physical or organoleptic properties of saliva as well as its chemical composition; careful note is first made of its quantity, color, transparency, consistency, odor, sediments and any other characteristics which it may present. It is then subjected to the action of various reagents, to determine its reaction, the presence of chlorids, sulfocyanids, ammonia compounds, glycogen, etc., and finally specimens are slowly evaporated upon microscope slides for the study of its crystallizable constituents by means of the microscope and the micro-polariscope.

My own studies of saliva have been mainly of specimens taken from individuals of the hyperacid diathesis, for which reason and because they present certain features of especial interest to us as dentists I shall ask your attention more particularly to them.

Clinically we find that hyperacid individuals are those who are more or less subject to gout and rheumatism, migraine, various nervous phenomena due to general acid intoxication, various forms of nephritis or arterial sclerosis and not infrequently they may present carcinoma or some form of epithelioma and leucoplakia. The teeth of such subjects are usually free from true caries but are attacked by erosion in some of its forms and often with interstitial gingivitis. They are generally overfed individuals of sedentary or inactive habits and their diathetic state is one always dependent upon incomplete oxidation in the process of cell metabolism. I have characterized these cases as overfed individuals. I should perhaps be more accurate were I to characterize them as improperly fed individuals for the reason that I regard the kind of nutritive supply as being fully as important as its amount.

My interest in this class of cases arose out of my studies of dental erosion, for it soon became evident that the frequent association of that disorder with the hyperacid diathesis had a significant bearing upon its etiology, and the search for the cause of the erosion of the teeth developed some interesting data bearing not only upon the phenomena of the diathetic state itself but upon the causes of certain disease conditions of which the general nutritional fault was the primal cause.

I have already reported in a paper before the Second District Society of New York some studies of erosion which I believe demonstrate the fact that at least one form of the disorder is due to a general lactic fermentation in the oral cavity and in which the teeth are generally attacked by the lactic acid solvent and are rapidly decalcified. These lactic acid cases are, however, quite different in their clinical aspect from other cases of erosion found in typical hyperacid individuals and in the paper referred to I ventured to suggest the necessity for a new classification of erosion cases into those in which the expression of the solvent action was general for all surfaces of all of the teeth, and another class in which the loss of structure was localized upon a few teeth and due to the solvent action of the acid mucus exuded from certain disordered buccal mucous glands. For this latter type of the disease I tentatively suggested the term graphic erosion as somewhat indicative of the almost hieroglyphic form which the eroded areas often presented. I further stated in the paper referred to, that my studies had led me to believe that the solvent causing the loss of structure in these cases of graphic erosion was the dihydrogen sodium phosphate. I am able now as the result of further investigation to confirm that opinion.

In a paper presented before the Ohio State Dental Society at its Columbus meeting in December last, I directed attention to a form of tooth dissolution frequently observed in the deciduous dentures of children overfed upon carbohydrate foods and in adult individuals of the hyperacid diathesis similarly fed which had been mistaken for rapid caries, but which my studies of the mixed oral secretions had led me to believe was a process of rapid erosion due to unusually active production of dihydrogen sodium phosphate. I was led to this conclusion as to the etiology of the disorder by finding in the saliva not only large quantities of the acid sodium phosphate, but also the calcium compound resulting from its action upon the tooth structure as well. The mechanism by which this excessive production of acid phosphates is produced in the mouth I have previously reported in the paper read before the Ohio State Society already referred to, but I desire for the sake of a clear understanding of certain other phenomena dependent upon the same diathetic fault to recapitulate it here.

As already stated the hyperacid diathesis is characterized by a defect in metabolism by which the oxidation processes are inferior to normal. The intake of oxygen by the cell is apparently disproportionate to the pabulum which the cell is required to convert into its normal end products and as a consequence the ratio of carbon dioxid to oxygen in the blood becomes greater than normal. Under ordinary circumstances a temporary increase in the ratio of carbon dioxid to the oxygen of the blood is corrected by the action of the renal epithelium in which a reaction occurs between the carbonic acid of the blood and its contained basic phosphates as follows; $H_2CO_3+HNa_2PO_4=HNaCO_3+H_2NaPO_4$. The mass action of the carbonic acid upon the alkaline sodium phosphate results in the formation of acid sodium phosphates which is eliminated by the kidneys and of sodium bicarbonate which is returned to the blood, the result being that the alkalescence of the blood plasma is maintained at the normal point. The same principle applies to the conversion of basic calcium phosphate into acid calcium phosphate under excess of carbonic acid in the blood plasma. When, however, the disproportion between the intake of oxygen and of pabulum by the cell is indefinitely maintained as is the case in the hyperacid diathesis, the suboxidation with excessive production of carbonic acid becomes a chronic condition and the renal epithelium is no longer sufficient to maintain the alkalescence of the blood plasma by eliminating the excess of acidity as acid phosphates so that under the stimulus of the high carbonic acid content of the blood plasma other epiblastic structures take on the function of acid phosphate elimination which is normal to the renal epithelium, and exude an acid fluid instead of a normally alkaline secretion.

Among the epiblastic structures thus irritated into abnormal function are the buccal mucous glands which under the diathetic conditions stated exude a mucus containing large quantities of acid phosphates of sodium and calcium which exert a localized solvent action upon the tooth surfaces in contact with the orifices of the disordered glands and produce the wasting of tooth structure which we know ordinarily as dental erosion. It is significant also in this connection that the glands themselves in the course of time become hypertrophied to an extent which in old chronic cases makes their form at times plainly visible in the tissues of the under side of the lip. The dermal epithelium and sweat glands in these cases frequently exude the same acid phosphates, giving rise to eczematous eruptions.

It would seem to be obvious that the mechanical or operative treatment of dental erosion is in the light of its etiology practically futile if its recurrence is to be avoided. It is hopeless to attempt to permanently correct the local lesion until the constitutional fault has been eliminated.

The critical study of this problem has led me to the careful investigation of both the saliva and the urine and to some extent the study of the blood in these cases with the hope of discovering the nature of the nutritional error as a first step toward its correction, and I now ask your attention to some of the results thus far attained.

Recalling to your minds the fact that the basal characteristic of the typical hyperacid individual is his diminished power of oxidation leading to the relatively increased production of carbonic acid, which in turn converts his basic phosphates into acid phosphates; we have as a result the rapid and continuous elimination of phosphorus from the system—for the reason that the acid phosphates are extremely soluble and have a higher osmotic tension that the basic phosphates, hence they are carried off by the kidneys in large quantity, developing a true phosphaturia or so-called phosphatic diabetes, a disorder which has been clinically described by Teissier, of Lyons, France, and Ralfe, of London.

As before stated, the skin and buccal mucous glands in these cases also contribute to the loss of phosphates until in time the patient becomes phosphatically starved and presents certain evidences of ill health; he becomes neurasthenic, irritable or despondent or may manifest other forms or nervous irritation, i. e., migraine cerebral hyperemia or hysterical phenomena. The loss of phosphates continues until a point of depletion is reached where they are found only in minute quantity in the urine or the saliva. At, or just previous to, this period triple phosphates and oxalates appear in both saliva and urine and the nervous irritability is markedly increased, the malnutrition being further manifested at this period by a comparatively rapid loss of weight. Later acetone and diacetic acid make their appearance in the secretions along with creatin and in some cases cystine, at which period profound mental torpor, at times almost amounting to coma, is not infrequently manifested or there may be extreme nervous irritability, amounting almost to hysterical mania.

Coincident with the loss of phosphates in the later stages of the disease, a loss of available nitrogen occurs not as urea, uric acid or ammonia, but of nitrogen in combination with carbon as a cyanogen radical, in which condition it should have normally entered the nutritional cycle for the uses of the bodily economy but which is "side tracked," as it were, and lost by combination with the acid phosphates eliminated by the kidneys and the other excretory structures already referred to.

Loss of nitrogen in cases of acid toxemia has already been recognized by several observers, the chemical mechanism of the process having been explained upon the assumption that nitrogen as ammonia was lost in neutralizing the acid end products of metabolism in the blood stream. I have, however, experimentally determined that it is nitrogen, not as ammonia but as ammonium cyanate, a probable forerunner of urea, which is thus lost in the cases of faulty metabolism constituting the hyperacid diathesis; a much more important matter when the biogenic function of this form of nitrogen is taken into consideration. Evidences of imperfect oxidation of proteids are also manifested in the saliva and urine by the presence of lactates of ammonia and of calcium, creatin, acetone and oxalates with increase of urates of ammonia and amorphous urates; the urine also frequently contains indican especially in cases complicated with disordered liver and habitual constipation. The saliva is usually constantly acid due to the presence of acid phosphates and the dental lesions are ordinarily erosions or when the acidity is absent pyorrheal invasion of the peridental membranes.

Many of these cases in the later stages develop epithelioma or leucoplakia buccalis or both together, and in view of the fact that in certain types of the diathetic condition under consideration the constant exudation by the epiblastic tissues of acid phosphates and other irritant waste products of faulty metabolism is a characteristic feature, it does not seem to be an altogether groundless suspicion that these irritating exudates may be an etiological factor in the production of the morbid growths referred to.

The data upon which I have based the analysis of the conditions I have here attempted to describe were obtained through the methods of study and observation promulgated by Dr. Michaels and I am especially indebted to him for his valuable methods of technique which have been of incalculable service in the study of this complex problem. I shall at the conclusion of my paper endeavor to demonstrate to you some of the more striking features of the technique by means of the micro-polariscope, so that you may be able to see some of the characteristic reactions of certain of the crystalline waste products of faulty metabolism in the hyperacid diathesis.

Before dismissing this phase of the subject I desire to say a few words concerning the therapeutic aspect of the question. I will ask you to bear in mind that I have limited my studies thus far to a distinct class of cases, viz., arthritic, in whom the elementary fault of nutrition is unquestionably a diminished power of oxidation with excessive production of carbonic acid as the result thereof and as a secondary consequence the excessive production of acid phosphates together with a variety of toxic waste products from the imperfect oxidation of proteid food. In the treatment of these cases I have aimed not at the objective symptoms but at the correction of the metabolic fault. The diet has been so regulated as to reduce to a minimum the intensity of the demand for oxygen and to that end carbohydrate foods have been as nearly as possible eliminated from the dietary in the early stages of treatment. Succulent vegetables, gluten bread, milk, albumen and a moderate ration of proteids in the shape of fish, oysters, game, light meat of fowls, etc., has been allowed. For medication my best results have been obtained by the continuous administration of small doses of phosphorus or of arsenic iodide along with the glycero-phosphates of lime and soda. This regimen in connection with correctly adjusted exercise and rest and attention to general hygiene has yielded most marked and satisfactory results. In a chronic case of typical hyperacid diathesis, neurasthenic to a high degree, great loss of bodily and mental power, pronounced acid intoxication, acetone in both saliva and urine, the latter loaded with acid calcium and sodium phosphates, general debility so great as to make a skilled attendant a necessary domestic fixture, I have had the satisfaction of seeing improve under four weeks of the treatment described so that the attendant is no longer necessary and the patient is taking vigorous physical exercise, attending daily to business for several hours and the whole physical and mental status indicates a progressive and comparatively rapid return to health. Examination of the urine shows a decrease in specific gravity of from 1034 at the beginning of the treatment to 1016 at present, absence of acetone and of acid phosphates beyond normal and what is of especial interest, almost entire cessation of abnormal loss of nitrogen.

I have taken the liberty of presenting this subject for your consideration because it is my belief that it involves the problem which we must next attack if we are to accomplish what is expected of us in the treatment and cure of certain conditions that we have claimed are strictly within the province of the dentist to treat and cure. I am convinced that the constitutional factor must be reckoned with and combated in some of the most common mouth and teeth lesions which daily come under our care, as for example, dental erosion, phagedenic pericementitis, probably dental caries and certainly various neoplasms and morbid growth of the soft tissues of the oral cavity. I am strongly of the opinion that the study of faulty metabolism is a field that is of equal if not greater importance for us to become familiar with than is bacterial pathology, fo it is beginning to dawn upon our minds that good health is the best guarantee against bacterial invasion and that it is faulty nutrition which is mainly the prodromal condition of infecton.

The building up of the natural bodily defenses by establishing normal conditions of nutrition is not only the true prophylaxis, but it is in a very evident sense the only rational basis of therapeutics.

PRESIDENT'S ADDRESS.*

By E. J. Perry, D. D. S., Chicago, Ill.

I will not undertake a review of the dental events of the year past, but rather speak of a few things most impressive to me. First in importance to us as a profession in my judgment, is the late meeting of the International Dental Federation at Stockholm, Sweden. Few of us realize all that this meeting meant. Its real significance reaches farther than even the members knew or expect. Individually we need widening. We work in small offices and we work hard. We love our work. Naturally we get into grooves. We get to thinking that our little sphere in the world is larger than it really is. Some years ago the following was related of a great base-ball player. He was told the news of Garfield's assassination. Said his informant, "Garfield is shot." "That so? What club did he play in?" This ball player, almost the best in the country, had forgotten the great world of which base-ball was a very small part. He was skilful in the highest degree, he had reached the pinnacle of base-ball fame, but was narrow and ignorant. When I honestly examine myself I find a narrowing tendency on my own mind caused by the intensity of my work, and I see this in others of my friends. The fault is in ourselves. We need to raise our eyes and get a larger view of the world; look at other people's worlds; so also has it been with us as a nation. We have thought that America was the cradle of dentistry; that the dental sun rose and set in the United States of America. And in spite of our great skill and all that in absolute truth we are, it narrowed us and prevented our development. American dentistry needed to raise her eyes and widen the horizon of her view. She has done this. The meeting at Stockholm was a great ganglion into which great impulses went and in turn went out to all the dental world with added power. It was not only a center into which men from all parts of the world poured power and force and knowledge, but it was a center which, like the ganglion itself, generated or accentuated these things. Now as a result of this greatest of all great meetings what? The low places will all be leveled up to the high places. The highest standards in dental education will prevail, and will be world wide. There is to be one standard and that a world standard.

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*Read before the Odontological Society of Chicago, November, 1902.

The dental educators of the world are coming nearer together. We surprised them. They surprised us; the result a surprise to all. Is this not then the chiefest dental event of the year? Next comes the growth of the conviction that porcelain inlays are to have a firm place in dental practice. Porcelain inlays will not down by the cry of fad. The system when it shall be crystallized is laid in science and cannot be torn away by abuse or ridicule.

A friend of mine hit me hard lately by referring to a very skilful and successful practitioner who is doing a large amount of inlay work as unsound and likely to run quickly after a fad. My brothers, let us keep our minds and our hearts open. It is so easy to prejudice our brothers. Let us examine the fundamentals of inlay work. How does porcelain fit the indication as a filling material? It is the color of the tooth. It is a non-conductor of thermal changes in harmony electrically and thermally with the tooth substance. Its retention in the cavity is by adhesion as against wedging, corking and doweling as with the metals. Cavity preparation for inlays is much less painful than for gold or amalgam. The retention grooves, pits, etc., cut into the tenderest portion of the cavity near the juncture of the enamel and dentine for gold work is often very severe. Also it endangers the life of the pulp by thermal shocks, whereas the same cavity preparation for an inlay is done with gem stones run in water, thus eliminating a vast amount of pain. The gold is welded against the walls of the cavity and margins, thus chipping, grinding, or bruising the margins; the evidence of this is its staining, leaking and final decay, and the effort now made to extend the margin of the cavity into an area of lesser immunity from decay.

In the insertion of the inlay, retention is by adhesion of a plastic cement. No injury to the enamel margins is possible; no insidious decay ever occurs; the inlay stays in and perfectly seals the cavity or comes out, leaving the cavity clean and unharmed by decay. Your gold, not oftentimes perhaps, but sometimes stays in while decay goes on more rapidly than if it should drop out. Now this is not meant to prove that a gold filling is not a good filling, but only to show that the filling to use in a given case is the one which fills the larger number of requirements. For instance, where edge strength is indispensable, use gold, also in all occlusal cavities, and all small cavities for adults. In large, deep proximal decay, in labial and buccal decays, use the porcelain inlay. Inlays are impracticable in any pin-head cavity. Pin-head cavities should be extended and even then mostly should be filled with gold. This but very briefly touches some of the points of strength or weakness in porcelain and metal as filling materials. It is not meant as a comparison; there is no profit in comparing them, but to show that porcelain has decided indications in a large and important number of cases, and that gold alone does not fill these requirements as well. Some practitioners will abuse inlay work, no matter—so much the worse for them. I say its coming into practice is of vast importance; guard against extremes. Let us keep talking about and working at the inlay. It is my belief that we are on the edge of a great advance.

The work of Professor Finsen, of Copenhagen, in the treatment of disease with electric rays is attracting much attention, and his wonderful success as set forth in a foreign medical journal, which

I have had read to me from the French, is marvelous. Dr. Kair, of Copenhagen, recently here, and our own Drs. Brophy and Harlan, know of his work and will no doubt be willing to speak of it in the discussion of this paper, and treat of its bearing on our work as dentists. May we not expect that some day within the year we shall be able to treat pyorrhea alveolaris by the electric rays? There seems to me to be a steady advance in our chosen specialty. Its literary and periodical betterment, its improved methods of teaching, and the preparations for the great international meeting to be held at St. Louis, in August, 1904, etc., are all subjects which this society can at this meeting discuss.

ANTISEPTICS AND DISINFECTANTS.*

By Geo. W. Cook, D. D. S., Chicago, Ill.

Since the recognition of the phenomena that fermentation and decomposition or putrefaction of vegetable or animal matter are carried on through the physiological activity of bacteria, and also that certain bacteria are capable of acting in a deleterious manner on the higher animal organisms, thereby causing the well known phenomena of disease, the attention of investigators has been directed to the finding of a chemical agent capable of inhibiting the development of bacteria, thus rendering substances antiseptic, and also, if possible, agents capable of destroying bacteria and their spores, thereby rendering substances germ free or disinfected.

But in this connection it is well that we have a clear idea of the terms antiseptic and disinfectant. While all the chemical substances which have the power of destroying bacteria and their spores are termed disinfectants, it necessarily follows that in weaker solutions they may only inhibit the development of bacteria, and thus be termed antiseptics. On the other hand, it does not necessarily follow that all chemical substances which are capable of inhibiting the growth of bacteria, are capable, in stronger solutions, of destroying them altogether. It is well known that many of the volatile oils and sugar will not permit the growth of bacteria, but have no power to destroy bacteria or their spores no matter how concentrated. Such agents are only antiseptic. In this paper we will have little to say concerning the true antiseptics, or those chemicals having only the power to inhibit the growth of germs, but wish to speak particularly of chemical substances which in weak solutions have an inhibitory action, and in stronger solutions are disinfectants or render substances germ free.

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*Read before the Chicago Dental Society.

More than a century ago experiments were carried on by a distinguished military physician, Pringle, upon the action of disinfecting infectious material. After the investigation of this scientist there was a period in which men were only guided by their sense of smell, and were of the opinion that when a nauseous stench could no longer be detected, the cause of the disease had been destroyed. "Unfortunately such a crude empiricism is followed by a large majority of the dental profession of today."

With such ideas as these before them surgeons made extensive use of substances like lime, and sulphate of iron; and the whitewashing of rooms became one of the most favorite means of disinfecting.

It may be said that Semmelweiss established the aseptic method of treating wounds by the use of chlorine water, which he also recommended for the cleansing of surgeons' hands. The next substance that was used for the purpose of disinfection was carbolic acid, which was introduced by a French apothecary named Lemaire, and later Lister used this agent for the antiseptic surgical dressing of wounds. This empirical method was practiced until Koch clearly demonstrated between the action of chemical agents on both the vegetative and resting stage of bacteria. He at that time thoroughly distinguished between the simple inhibitory action and that of killing bacteria and their spores. It was during this time that corrosive sublimate was proved to be most effective as a disinfectant, and that chlorine was of greater value than carbolic acid.

Koch, during his investigation, found that anthrax spores would not germinate in nutrient media when in corrosive sublimate, 1:300,000; hydrochloric acid, 1:1700; salicylic acid, 1:1500; potash soap, 1:1000; carbolic acid, 1:850; quinine, 1:625. It required a 2 per cent solution of corrosive sublimate for one hour to destroy the spores of anthrax; a 2 per cent of chlorine water had practically the same effect, while these other substances required many days; and the anthrax spore lived for more than forty days in a 5 per cent carbolic acid solution.

Soon after these investigations by Koch it was recognized that mechanical purification must precede disinfection, consequently acids and alkalies became an important factor in the preliminary preparation of parts for disinfection. Caustic soda, quick-lime, and milk of lime dissolved in water were considered as valuable disinfectants. Acids proved of great value, especially the mineral acids. The organic acids are not nearly so effectual on bacterial life, and especially those acids produced by the physiological activity of bacteria.

The effective action of bichloride of mercury as a germicide is very much diminished in an alkali media containing an albuminous substance, for in such solutions an insoluble albuminate of mercury is formed, unless there is added to the solution sodium chloride or ammonium chloride, which causes the formation of an oxide or hydroxide. Following this observation it was found that the true disinfectant properties of carbolic acid were due to the cresol that it contained, and that the crude carbolic has a greater quantity of cresol than the pure carbolic acid. Owing to the fact that crude carbolic is insoluble in water, Hueppe prepared a solution by adding sulphuric acid, forming what he called phenol sulfonic acid, which is very soluble in water. This agent was claimed to have great germicidal properties but is was found that there was a difference in the action of this agent on the anthrax spore, for in one instance it would destroy the spore, while in another it would not.

Laplace made the discovery, however, that there was a difference in the molecular arrangements and that the chemical formula differed; there being two compounds known as the ortho-phenol sulfonic acid and the parra-phenol sulfonic acid. These two chemical agents were found to act very much the same upon the vegetative stage of bacteria, but upon the spores of anthrax the ortho-compound acts very much more energetically. The preparation of these two compounds is accomplished by the difference of temperature at which they are mixed. To obtain the ortho-sulfonic acid the crude carbolic and crude sulphuric acid are mixed in a cold place; while the parra-compound can be obtained by heating the ortho-sulfonic acid to body temperature or higher.

Repeated attempts have been made to render the phenols and cresols soluble in water, consequently, all sorts of mineral acids and alkalies have been used. Many of the hydrocarbon compounds were found to be more or less soluble in soap solutions; thus we have the well known agents creoline, sapocarbol and lysol. At first it was thought that these solutions rendered the phenols and cresols more soluble in water and in this way would prove beneficial disinfectants, but with many bacteria they act only as antiseptics.

As has already been stated the cresols were looked upon as being very proficient disinfectants if they could only be rendered soluble. Sodium salicylicate was likewise combined with cresol, making a compound that acted as a very proficient antiseptic but having very little value as a disinfectant. All of these substances must depend upon their antiseptic properties for the cresols they contain, and perhaps the most efficient one is lysol, because it emulsifies fats. A combination of sodium cresol, a preparation known as solutol, is also an alkaline solution which saponifies fats and dissolves proteid bodies; thus combining the cresol for its disinfecting properties and the sodium for its cleansing properties. In some instances this substance might act as a disinfectant, but it would depend very largely upon the micro-organisms and the substance in which it was growing. From the agents just mentioned, and the efforts of investigators to render these substances soluble, it would seem that the germicidal properties of an agent depend upon the complexity of the molecular structure and the reactivity of the atom groups in the molecule. Consequently we cannot rely upon any agent that does not readily go into solution.

This brings up the question as to what we understand by a solution. A solution as we understand it at the present time is dividing the atoms in the molecule, thereby making the substance capable of diffusing through animal membrane; thus we see that an agent to act as a chemical disinfectant must be capable of readily going into solution, and in the process of the division of the molecular structure, that part of the agent that acts as a protoplasmic poison must pass through the cell wall of bacteria and attack the proteid molecule. We here recognize at once the possibility of such an agent acting more deleteriously to the cell of man and other animals than that of the bacterial cell, because of the organic structure of the cell wall, and the different organs and tissues of both the higher animal and plant life.

At the present time it is thoroughly understood that the bacterial cell wall is a far greater resistant to osmatic pressure than is the cell wall of the multi-cellular organism, or even some of the very low forms of the alga and many of the low forms of the protozo, like the amoeba. We recognize at once the almost seeming impossibility of obtaining a biological disinfectant or one that we could even say was a biological antiseptic. What we mean here is that an agent would act upon the cell structure of the bacterial cell instead of the cell of the multi-cellular organism. Many of the agents named act very energetically upon the vegetative stage of bacteria, while the spores of many forms of microörganisms will live for an indefinite period in many agents that are now being used for their disinfectant properties. For instance, we might mention the hydrocarbons of the aromatic or benzine series (CnH_2n+_2). The commonest constituents are terpenes, having a general formula of ($Cn+H_2n+_3$, + or C_5H_{10}). There are some twelve of these terpenes, all having this general formula, but differing in their sterometrical forms or optical activities. While some of these oils contain only terpenes, many of them contain in addition some oxidized aromatic substances, as the phenols, ketones, aldehyd acids, etc. The oils containing oxygen are not so volatile as the pure hydrocarbons. As has already been mentioned, to obtain the chemical antiseptic properties of an agent it must readily go into solution; therefore such substances as the hydrocarbon compounds can not be considered other than an antiseptic to spore-forming bacteria, and possibly a disinfectant to the vegetative stage of the microörganisms. Cushny has stated that their antiseptic properties are doubtlessly due to the volatility of the agents, acting only as a foreign substance, but there is a class of substances somewhat closely allied to the above-named agents. This is the chinoline series and aromatic series (carbolic acid and salicylic acid series). The greater number of this series are obtained from the coal or wood tar.

Coal or wood tar preparations from which cresol and phenol are derivatives, the cresol, guaiacol and other less poisonous aromatic compounds, are present in greater quantities than the phenols and dioxol benzols; the three cresols are nearly related to the carbolic acid chemically. The meta-cresol is less poisonous to mammalia and less irritating, but much more destructive to microörganisms than carbolic acid. The parra-cresol is the most powerful of all. These substances are only slightly soluble in water; therefore there has been some difficulty in rendering them available as anti-septics. This has been partially overcome by forming an emulsion with the coal tar oil containing considerable hydrocarbons and a little phenol, mixing with soap and diluting with water. As has already been stated, this is the so-called creolin. While on the other hand we take the tar containing little hydrocarbon and more phenol, in combination with soap, diluted with water, and we get the sapocarbol and lysol. These are evidently not preparations of cresol. Recently there have been brought out three isomeric cresols. Only one of these will be spoken of here—the tri-cresol. This substance is soluble in water two and one-half per cent. It is not nearly so poisonous as the other agents spoken of, but is an active protoplasmic poison to the microörganic cell. It proved to be antiseptic 1 in 300, and caused death of the germs in five minutes.

Thymol is another homologue to carbolic acid, the formula of which is $C_6H_3C_3H_7CH_3OH$. This comes from the common thyme and several other plants, and forms in large colorless crystals and is very soluble in water. While this agent seemingly has never attracted very much attention as a general antiseptic, still in our experiments it proved to have much greater antiseptic powers than carbolic acid.

Guaiaquin is a chemical substance prepared by treating pure crystalline guaiacol with concentrated sulphuric acid. The agent is composed of 44.26 per cent. of quinin combined with 55.74 per cent. of guaiacol sulphonic acid. This is a yellow acid salt, very soluble in water and alcohol, and possessing the formula $C_6H_4O_2CH_2HSO_3$ or $C_2OH_{24}N_{202}$. This acid was antiseptic to 1 to 300, and caused death in five minutes.

Chinosol is another agent that proved to be very markedly antiseptic and caused death in about three minutes' exposure. Chemical formula $C_9H_6NK_{320}$.

So far as I can learn, Kleb was the first to place the antiseptic value on this agent that it evidently deserves. This substance seems to answer every purpose as an antiseptic in dental use. I placed in five teeth that had previously been soaked in bouillon twenty-four hours a mixed culture of staphylococcus, hay bacillus and bacillus prodigus. They were then rolled in moist, sterilized cotton and placed in the incubator for six, ten and twenty-four hours. They were then taken out and treated with chinosol, ten per cent, three minutes in each tooth. The tooth which had been left in the incubator twenty-four hours gave a culture of hay bacillus, but all the other teeth were found sterile.

These last two named agents are non-irritating to the tissue under ordinary circumstances. This shows the possibilities of obtaining a true chemical disinfectant.

I have called attention to such agents as proved most beneficial as a disinfectant and seemed to have but little irritating properties, in the experiments carried on by Dr. MaWhinney and myself.

In a discussion before the Odontological Society something less than a year ago I mentioned a chemical substance that had first been worked out by Neff and later by Novy. The germicidal properties of this agent proved in the hands of Novy and others to be a very efficient germicide, but it was such an unstable compound that it was extremely dangerous to handle it in its true chemical state. So Parke Davis & Co. attempted to incorporate it in an inert substance in order that it might be utilized as an antiseptic and disinfectant, and it is now known under the head of Acetone. Its efficiency as a germicide is influenced very largely by the substance the micro-organism is growing in, and also the kind of bacteria used. In the ordinary beef bouillon it has very little antiseptic properties, and I doubt whether it will ever become of importance in dental use. The original substance as brought out by Neff and Novy under the name of benzoasytol-peroxide was a very efficient germicide, but as has already been stated it could not be used in its true chemical state.

I have purposely omitted to mention anything of my clinical experience with the agents herein mentioned. Dr. MaWhinney, who follows me on this subject, has far greater clinical data than I have.

GERMICIDES: SOME DENTAL USES.*

By Elgin MaWhinney, D. D. S., Chicago, Ill.

A germicide is an agent that destroys germ life and their spores. It is a term of recent origin, and is derived from the Latin, gérman =germ+cædere=to kill; literally, to kill germs. In dental literature the term is quite generally used to mean pus-germ destroyers. It has only since the germ theory of putrefaction become understood that this word, germicide, has taken on its present significance. The recent studies into the phenomenon of life, physiological chemistry and pharmacology, bid fair to completely change our present system of therapeutics. We are beginning to see that our present accepted so-called rational system of treating pathological conditions is indeed most irrational and empirical. Not much longer will it do to treat certain conditions with certain remedies, simply because our fathers did, or even because we have observed in a previous case good results followed like treatment. We must now know the reasons why.

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*Read before the Chicago Dental Society, Jan. 6, 1903.

There is no department of medicine (using the term medicine to include ours and all other specialties) that is so unscientific as that of therapeutics. Enough work has been done to show conclusively that all remedial agents, of whatever nature, that have any action upon the physical organism do so by means of the chemical relation which they bear to the organ, tissue, or pathological condition treated. They act by means of a certain selective chemical affinity. Certain organs and tissues under certain conditions attract and appropriate certain medicinal agents, when so placed as to be accessible. Scientists have for several years recognized what is known as the chemotactic property of cell life—the attracting and repelling force which one cell or set of cells exert toward another. They look upon all organized life as a multiplication of cells, each having a specific function or functions, and each related to the other in a chemical way. The whole physical life process is a chemical one. The laws which govern the selection and preparation of food, digestion, assimilation and throwing off waste material are chemical. This is not only true of the whole organism we call man, but is equally true in the microörganic world. Furthermore, it also holds true in the relation of the former to the latter. The baneful influences of microorganic life upon higher organisms is exerted through chemical processes. The solution of animal cell tissue, plastic exudate in wounds, and formation of pus are all chemical processes in which microörganic life plays the important role.

To-night I want to present the thought of destroying this microörganic life and their baneful influences in animal tissue, by chemical means.

The disassociation theory of Arrhenius, which has many able exponents, and which has been developed to a marvelous point in recent years, throws much light on this problem. The theory explained in a few words is this: When certain organic and inorganic acids or salts are carried into solution, either in the body or outside, they split up into ions—the negatively charged ones called anions, and the positive ones called kations. The action of such agents, therefore, depends upon the nature of its ions. This fact was brought out through a marvelously interesting series of experiments of Professor Jacques Loeb, formerly of the University of Chicago, but now of the University of California. No longer do we deal in the main with the molecules of which a substance is composed, but with the ions into which it breaks up. "We know, for example, that we can substitute at will sodium iodide for potassium iodide, in order to produce certain therapeutic effects. These salts are alike in that they both yield I-ions; they differ in that the former yield sodium ions and the latter potassium ions. Any similarity manifested in the therapeutic effects of these two salts is determined by the similarity of their iodine ions. But we know that the potassium iodide is much more depressant than the sodium salts. This is due to the direct poisonous effects of the potassium ions upon muscle and nerves, an effect not exhibited by sodium ions."*

This same principle holds true regarding the germicidal action of drugs. They are efficient in proportion to the number of ions they contain. In mercury compounds, for example, it is not the amount of mercury in the salt, but the number of mercury ions that determines the efficiency. Example: A given per cent solution of $HgCl_2$ in alcohol; a solvent in which slight disassociation occurs is less potent than aqueous solutions.

What is needed now is an extended study of the exact action of various ions. We must learn what kind of ions produce a certain result. Then the chemist will have little difficulty in furnishing us with substances capable of disassociating into such ions as we need for a given purpose. This disassociation may often be brought about by first undergoing some change or changes within the tissue, and then going into solution and disassociation by means of the solvent in the tissues. With these ideas in mind, the chemists have been at work with no end of new remedies as a result, many of which are useless because they have not been sufficiently tested, but rushed, into the market to precede some other fellow. A few are excellent, and to some of which I want to call your attention. While these studies have been going on the physiologist has been at work, and shown us that germicides act upon the protoplasm of the proteid molecule in this chemical way. Proteids are the most important substances occurring in animal and vegetable organisms. None of the phenomena characteristic of life occur without their presence; they are invariably and constantly constituents of protoplasm. They are highly complex and uncrystallizable (for the most part) compounds of carbon hydrogen, oxygen, nitrogen and sulphur. The difference between the proteid molecule of higher forms of multicellular life and that of the purely vegetative forms has not yet been well made out.

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*Dr. Martin H. Fisher, American Journal of Physiology, 1901.

An enormous amount of work is necessary to bring out the exact relation and the exact composition of each. The inorganic salts, especially those of the heavy metals, such as mercury, iron, copper, lead, zinc, etc., act by forming insoluble compounds with protoplasm of bacteria. They do not penetrate deeply into the cell, and their action is, therefore, uncertain and usually very slight. $HgCl_2$ being the most potent of the group, because of its special toxic property, but its efficacy is greatly lessened if there are other proteids present, especially in the solutions which can be safely used on account of their toxicity.

The fatty acid series, the coal tar derivatives, phenol, naphthol, resorcin, salol, thymol, guaiacol, cresol, etc., and to this group we may add beechwood creosote salicylic acid, etc., also act by coagulating the protoplasm to a greater or less degree, but with these agents the coagulum is quite soluble, and so the agents, if kept in contact, penetrate deeper, and to that extent are fairly germicidal, especially to germs that have an easily permeable cell wall, and this is especially true of carbolic acid, which is more or less volatile.

It must be understood that none of these agents acts in a chemica way, but simply by coagulation, which is a molecular process. None of these agents enters into chemic combinations with the proteid. While the salts of the metals produce insoluble precipitates, and thus prevent greater penetration, so that their germicidal power depends upon the degree of precipitability of the different proteids. The aromatic series, to which belong the essential oils, can scarcely be called germicides. They act by simple irritation; in no sense chemic.

The oxidizers and reducers all tend to produce chemic changes in microörganisms. They all act rapidly, and are rapidly decomposed by all organic matter. Hydrogen dioxide is perhaps the best known of this class of agents. The rapid effervescence is evidence of its rapid action. The failure to get good germicidal results from this class lies in the difficulty to bring each germ into contact with the agents long enough to be destroyed. This difficulty is increased a hundred-fold when used within the tissues of the body, for the reason that they are equally active towards the organic matter of the tissues.

There is a fact which is often lost sight of in considering this subject which is of vast importance, and that is this: In application of germicides to suppurations we must consider the tissue in which the suppurative process is going on. Nearly all these old agents act more forcefully against the cells of the tissue than against the microörganisms therein.

Many, and, indeed, most, germicides are so coagulant, or otherwise destructive of the cell tissue, as to make their use in concentrated form dangerous, and, indeed, most of them possess general toxic or other deleterious properties after absorption which often endanger life. Therefore, in the practical application of germicides, we must always consider:—

1. Action on the system.
2. Action on the tissues of the part.
3. Action on the germs in the part.

And this brings us to two important points for consideration, namely, (1) the stimulating influence that certain agents exert toward the normal cell elements of the part; (2) the antiseptic influence that certain agents exert upon the whole organism, through the medium of the blood stream.

When suppurative microörganisms get into the injured tissue of a part, by any means, there occur some interesting things. The injured tissue will soon be seen to be literally filled with reparative cells, cells which are carrying the necessary elements of repair to the injury, and carrying away the useless, discarded elements to be excreted and thrown off from the body. Mixed into this veritable beehive will be seen these microörganisms, and if conditions are favorable they will grow and multiply rapidly. A "battle royal" occurs between these invading enemies and the reparative cells; sometimes one is victorious and sometimes the other, depending upon (1) the condition and nature of the microörganisms; (2) the condition of the cells of the part; (3) the condition of the general system. There is some interesting detail in this connection, but time forbids further elucidation. It must, however, be clear to everyone, and this is the point I am trying to bring out, that favorable resolution may sometimes be brought about by directing our attention to any or all of these three things: (1) We may destroy or inhibit the growth of the microörganisms direct. (2) We may stimulate the cells of the part to increased activity and they in turn destroy, break down, these enemies. (3) We may act upon the whole organism with reference to stimulated circulation, assimilation and excretion, or increase the blood antisepsis, any one or all of which, within certain limitation, would be equally potent so far as results are concerned. This explains why we have long been using certain agents which are not, strictly speaking, germicides, with good results. Iodoform, for example. I want to emphasize, if I may, the need of attention to all three of these things, if we would be very successful in treating serious suppurations. In every serious infection we should always look to the nature of the microörganism infecting; the condition of tissues of the part; and the condition of the whole system, with reference to nutrition, including excretion and circulation, and also the condition of the nervous system, before we determine what agent or agents we shall use.

The methods employed for determining the germicidal power of agents are many, all of which are imperfect, and whenever you read a statement of the germicidal power of any agent you must know the nature of the germs used in the test; how they were previously grown; how they were tested; in what media they were grown before and after, and what was the method of subjecting them to the agent, before you can have any idea of its value. All tests only prove so far as these things are known, and do not prove anything beyond that; because an agent proves germicidal toward a particular germ or mixture of germs, under certain conditions, using any method, only proves so far as that series, but does not prove anything so far as other germs or methods of using are concerned; therefore *all* experimental tests are only relatively valuable, and only useful for comparison, and beyond that prove nothing.

The literature of the medical and dental professions is full of conflicting statements regarding the potency of various agents, classed as germicides, the reasons for which are explained by the foregoing statement. In most cases I have succeeded in duplicating their experiments when the above conditions have all been stated. In not a few instances I have clearly demonstrated their faulty technique. I have tried almost every published method at some time or other in the last five years, and have concluded that the method suggested by myself in 1899 is open to the least objection, and yields results most nearly uniform, and yet I do not wish to convey the idea that this method will any way accurately tell what will occur when applied to actual practice in treating suppurations in the living tissue; but when these results are applied to such treatment, and there studied, and modified to meet condition, good results will follow. Until the chemistry of the proteid molecule under its various pathological changes is more clearly made out this is the best we can do. Pharmacology, the study of the action of remedies when practically applied, must at present be our main reliance. Science and experience must go hand in hand.

In making experimental tests, it is essential that the agent used be pure and reliable; that the germs be exposed to it in equal numbers under the same conditions; that they be at their maximum height of virulency, should be pure cultures, and that they be cultivated in media and temperature most favorable to their growth. In the experiments from which the following tables were made up the following method was used: Organisms were grown in bouillon made from lean beef (not beef extract) in the usual manner, and neutralized with sodium hydrate (not sodium bicarbonate). In series D and E it was made slightly alkaline. The germs were grown and distributed throughout the media in equal numbers, as shown by microscopic examination. The germs were transferred in loopfuls to small squares (a centimeter) of filter paper, which was previously sterilized and kept in a petri dish; there they were allowed to dry; then on to this was carried by means of the loop sufficient of the medicament to completely cover the filter paper, and left for various lengths of time, when each square was washed, so as to remove the medicament, and planted in fresh tubes of culture media, and placed in an incubator, at 37° Centigrade. Readings were taken from time to time for a week. The germicidal power of the medicaments is here determined by the *time* necessary to expose germs to it, and, as you will see, a great difference appears. You will notice that some agents were used in full strength and others in per cent. solutions, according as they could be used in practice.

In all of these series of experiments I began by exposing the germ to the medicament five minutes, and worked each way from that point, according as growth appeared or not. When doubt existed, inoculations were made in fresh media and in animals—guinea pigs and young rabbits mostly.

In these tables only final results are given. They are made up after many repetitions.

SERIES D.

Germ used, staphylococcus pyogenes aureus. Grown and plated out from abscess pus.

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil cassia	Full strength	55
Oil cinnamon	Full strength	55
Oil cloves	Full strength	55
Oil cajeput	Full strength	50
Oil eucalyptus	Full strength	60
Oil wintergreen	Full strength	60
Oil peppermint	Full strength	55
Oil cade	Full strength	50
Oil birch tar	Full strength	30
Oil pennyroyal	Full strength	42
Carbolic acid	95 per cent	30
Creosote, B. W.	Full strength	40
Campho-phenique	Full strength	40
Guaiacol	Full strength	40
Thymol	Alkaline, Saturate solution	30
Thiocol	Alcoholic, Saturate Solution	30
Aspirin	Alcoholic, 9 per cent. solution	30
Bichloride mercury	1-1,000	20
Phecene	Sat. solution	12
Creolin	Full strength	3
Trikresol	Full strength	5
Sublamine	1 in 250	5
Kresamin	Full strength	5
Phenol sulphonic	Full strength	5
Formalin	Full strength	3
Chinosol	10 per cent. solution	1

SERIES E.

Germ, streptococcus pyogenes in virulent form from periosteal abscess.

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil cassia	Full strength	60
Oil cinnamon	Full strength	60
Oil cloves	Full strength	60
Oil cajeput	Full strength	55

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil eucalyptus	Full strength	60
Oil wintergreen	Full strength	60
Oil peppermint	Full strength	55
Oil cade	Full strength	40
Oil birch tar	Full strength	30
Oil pennyroyal	Full strength	35
Carbolic acid	95 per cent	30
Creosote, B. W.	Full strength	40
Campho-phenique	Full strength	60
Thymol	Alkaline, Sat. sol	40
Thiocol	Alcoholic, Sat. sol	32
Aspirin	Alcoholic, 9 per cent. sol	22
Mercury bichloride	1 in 1,000	15
Phecene	Sat. solution	10
Creolin	Full strength	5
Trikresol	Full strength	5
Sublamine	1 in 250	5
Kresamin	Full strength	5
Formalin	Full strength	3
Chinosol	10 per cent	1

SERIES F.

Germ, Proteus bacillus.

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil cassia	Full strength	55
Oil cinnamon	Full strength	40
Oil cloves	Full strength	45
Oil cajeput	Full strength	50
Oil eucalyptus	Full strength	50
Oil wintergreen	Full strength	55
Oil peppermint	Full strength	50
Oil cade	Full strength	40
Oil birch tar	Full strength	30
Carbolic acid	95 per cent	20
Creosote	Full strength	15
Thymol	Liquor. potass., Sat. solution	20
Thiocol	Alcoholic, Sat. solution	10
Aspirin	Alcoholic, 9 per cent. solution	18

Agent.	Per Cent. Solution.	Time Required, Minutes.
Naphtha eucalyptus	Alcoholic, Sat. solution	10
Chinosol	10 per cent. solution	1
Mercury bichloride	1-1,000	22
Phecene	Sat. solution	10
Creolin	Full strength	8
Trikresol	Full strength	5
Formalin	Full strength	1
Tribromo phenol	Alcoholic, Sat. solution	8
Trichlorphenol	Alcoholic, Sat. solution	8

SERIES G.

Germ used, mixed pus culture.

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil cassia	Full strength	40
Oil cinnamon	Full strength	40
Oil cloves	Full strength	40
Oil cajeput	Full strength	45
Oil eucalyptus	Full strength	40
Oil wintergreen	Full strength	60
Oil peppermint	Full strength	50
Oil cade	Full strength	25
Oil birch tar	Full strength	20
Oil pennyroyal	Full strength	45
Carbolic acid	Full strength	30
Creosote, B. W.	Full strength	30
Campho-phenique	Full strength	40
Mercury bichloride	1-1,000	25
Creolin	Full strength	5
Trikresol	Full strength	5
Sublamine	1 in 250	3
Kresamin	Full strength	5
Formalin	Full strength	2
Chinosol	10 per cent	1
Phenol sulphonic	Full strength	5
Tribromo phenol	Alcoholic, Sat. solution	10
Trichlorphenol	Alcoholic, Sat. solution	8

SERIES H.

Bacillus pyoscyaneus. Isolated from pus.

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil cassia	Full strength	38
Oil wintergreen	Full strength	45
Oil cinnamon	Full strength	40
Oil cloves	Full strength	40
Oil cajeput	Full strength	45
Oil eucalyptus	Full strength	40
Oil wintergreen	Full strength	40
Oil peppermint	Full strength	40
Oil pennyroyal	Full strength	40
Carbolic acid	95 per cent. full strength	10
Creosote, B. W.	Full strength	20
Oil sassafras	Full strength	40
Creolin	Full strength	5
Trikresol	Full strength	2
Formalin	Full strength	1
Sublamine	1 in 250	2
Bichloride of mercury	1 in 1,000	5
Kresamin	Full strength	3
Phenol sulphonic	Full strength	2
Chinosol	10 per cent strength	1
Campho-phenique	Full strength	10
Eugenol	Full strength	30
Permanganate of potash,	10 per cent. strength	30

SERIES I.

Germ, bacillus prodigiosus.

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil cassia	Full strength	35
Oil cinnamon	Full strength	35
Oil cloves	Full strength	35
Eugenol	Full strength	32
Oil cajeput	Full strength	40
Oil eucalyptus	Full strength	40
Oil wintergreen	Full strength	40
Oil peppermint	Full strength	30

Agent.	Per Cent. Solution.	Time Required, Minutes.
Oil pennyroyal	Full strength	35
Carbolic acid	Full strength	15
Creosote	Full strength	18
Trikresol	Full strength	2
Kresamin	Full strength	2
Bichloride of mercury	1-1,000	5
Sublamine	1-500	2
Permanganate of potash	10 per cent	25
Phenol sulphonic	Full strength	5
Chinosol	10 per cent.	1

These tables only show the time required to completely destroy all life. Nearly all agents showed marked restraint in less time. Many of the germs exposed to the essential oils fifteen and indeed thirty minutes, grew as quickly and as luxuriantly as the controller.

You will note the excellent showing made by the following agents: Formalin, sublamine, phenol sulphonic acid, trikresol, creolin, kresamin, phecene, chinosol.

The application of germicides as such to treatment of oral diseases is quite limited. It is only in violent, acute, chronic, necrotic suppurations; in syphilitic ulcers, eczema, etc., and in each case the selection of the particular agent will be determined by the conditions present. They are also of value as hand and instrument disinfectors.

Formalin is a colorless liquid, resembling water in appearance, and is a 40 per cent. solution of formaldehyde gas. It is probably the most potent germicide that can be used. Its dental uses are limited, because of its extreme irritating property. I have used it in old chronic abscesses, but in nearly every instance severe pain and swelling resulted, which has caused me to abandon it except in weak dilutions in such agents as creosote.

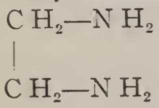
Paraform, a new solid polymer, has recently been recommended. There is a class of cases where it is of value, if used with care. I refer to old blind abscesses on the roots of teeth, containing small tortuous canals. This agent readily gives up formaldehyde gas, which is very penetrating. It should only be placed in the large entrance to the pulp chamber, and not down in the root canals, and even then it stirs up some irritation. In coming to this conclusion, I have lost some teeth from its use, but if you are careful and use it as stated you will find it of excellent value. Recently some practitioners have recommended it as a component part of root fillings. I am somewhat skeptical of the result. In old chronic cases, where there is little or no discharge of pus, but instead a thin ichorous fluid comes weeping down into the canal, cases that are not causing any great amount of pain, but sore and constantly annoying, in all such cases I get good results from this drug. It always increases the soreness and inflammation, which soon terminates in resolution. Perhaps the most valuable use we can make of this agent is as a disinfectant for foul rooms, for operating rooms, where serious surgical cases are attended to. For instruments, especially those used on syphilitic cases.

Paraform has recently been put upon the market in tablet form, especially designed for use in Schering's sterilizer. It is both effective and convenient.

Bichloride of mercury as a germicide was first brought to the attention of the medical profession by Koch, since which time its use has become almost universal. It is a potent germicide toward all germs that have a very permeable cell wall. It is very corrosive, producing insoluble coagulum, and therefore limiting its power. Its most serious objections are its irritant and toxic properties. In dental practice its use has been quite generally abandoned, except as a hand disinfectant, and on gauze for packing suppurating antrum; also in syphilitic cases.

Sublamine. Ethylenediamine sulphate of mercury. A new agent, recommended as a substitute for bichloride of mercury.

Ethylenediamine is an organic base, with a chemical formula of



$$\begin{array}{l} CH_2\text{—}NH_2 \\ | \\ CH_2\text{—}NH_2 \end{array}$$

It is a clear, colorless liquid of alkaline reaction, and gives off the odor of ammonia. This substance is used in connection with several coagulant germicides, for the purpose of reducing their irritant property and increasing their penetrative power. Sublamine comes to us in solid form, and is freely soluble in water. I have been using it in the strength of 1 in 500, and find it but very slightly irritating. It is a non-coagulant, and will penetrate much more deeply than bichloride. In all the tests it has proven much more efficacious than bichloride, and certainly is much more agreeable to use. I can most heartily recommend it for sterilizing hands, washing indolent ulcers, flushing the antrum, for washing through chronic abscesses, sterilizing the skin before operations. For all these purposes I have been using it in my private practice, as well as in the public infirmary. It is a chemical germicide, carrying pus into solution.

Phenol sulphonic acid is a light reddish-colored liquid, made by combining equal parts of sulphuric and carbolic acid. It is not so coagulant or irritating as either of the substances from which it is made. It can be used in full strength for burning through old chronic abscesses, and is especially recommended where cases are of long-standing, with more or less of bone absorption around the apex of the root. It is valuable to enlarge root canals, and to burn out the socket after a badly abscessed tooth is removed. Of course, it must always be used with caution. A 50 per cent solution is especially recommended to aid in the exfoliation of necrosed bone; it will also disintegrate and dissolve small pieces of tooth and necrosed bone that may be left after burring or curetting about the jaws. I use it on gauze for the first packing after such operations, especially in the antrum. Weaker solutions may be used to wash out after surgical operations on the jaws. I have come to look upon it as one of my most valuable agents.

Trikresol; another product from Schering's chemical laboratory. Its composition is as follows: Ortho-cresol, 35 per cent; meta-cresol, 40 per cent, and para-cresol, 40 per cent. It is a clear liquid pungent odor, resembling phenol; turns slightly red on exposure to strong sunlight. Is soluble in 2 per cent water, but freely in alcohol and oils. It is a splendid germicide, as shown by these experiments, and an agreeable preparation to use. I have been using it about four years, and now find I am using it in almost every condition where I formerly used carbolic acid or creosote. It is not so escharotic as carbolic acid; will penetrate much deeper into vegetable cells, and will destroy spores. Two per cent solution is antiseptic. I recommend it to burn out old abscesses; as a dressing in root canals in acute apical pericementitis; in putrescent pulp; to relieve odontalgia, applied warm or almost hot. It penetrates the dentine as readily as the essential oils, but does not discolor it. A little (not an excess) is useful as a dressing after pulps are extirpated, before filling root canals. To keep scalers and such instruments sterile while using, I keep them in a ten per cent solution in alcohol and water. It is an excellent agent, used full strength, as a first treatment in pus pockets about the roots of teeth.

Kresamin is the name given to a combination of ethylenediamine and trikresol, containing equal parts of each It is a reddish-colored, phenol-like liquid; has an agreeable odor, and is very slightly irritant. It is practically non-caustic, and but feebly coagulant. It is powerfully germicidal, equal to 1 in 500 bichloride of mercury. I have been using it lately in the clinic, with most flattering results. I am satisfied if used in acute or recent chronic abscesses it will be of value. I wash through such abscesses freely with it. I have passed some around among a few of my dental friends, and they are all delighted with the results they are getting with it. It is freely soluble, and may be used as an antiseptic in dilute solutions. It is a chemical disinfectant. When brought in contact with thick pus, kresamin seems to immediately dissolve it, and turn it a dark brown color. In apical pericementitis from any cause, it seems to be of great value; also applied to inflamed pulps it has an immediate quieting influence. In all inflammations acompanied with pus formation I am sure of its efficacy.

Chinosol has a chemical formula of C_9H_6N. KSO_4, and is prepared by the action of sulphate of potassium on chinoline, a basic coal tar derivative. It occurs in the form of a crystalline yellow powder, possessing a very slight odor, and pungent coal tar taste. It is freely soluble in water, but insoluble in ether or alcohol. It is a chemical germicide. When brought in contact with pus in the slightly alkaline fluid of the tissues, it is readily broken up into oxychlorine, and it is this that is so powerfully germicidal. So far as my knowledge goes, it is the most potent germicide, so far as pus germs are concerned, of any agent at our command. I began using and recommending it for the eradication of pus in 1893, since which time it is my main standby. It has two slight objections, namely, it corrodes steel instruments (not others), and has a slight tendency to darken teeth; such discoloration is very readily removed with any oxygen bleacher. Being almost devoid of odor, it is not a very good deodorant for foul-smelling dentine, but as a pus-destroyer, it certainly has no equal.

It is practically non-irritating; is wholly non-coagulant, and non-caustic. I use it in 2 per cent solution for washing out bad pus pockets, abscesses in antrum, and alveolus. I use a ten per cent solution in chronic, foul, violent abscesses, and all other violent suppurations. It is used only for the purpose of getting rid of pus. When you need to burn out necrotic tissue, it is not recommended. It is wholly non-toxic, and can be used *ad libitum* in these solutions. Injected into a forming abscess, boil or carbuncle, it will immediately get rid of the pus. In any case of violent pus infection, where there is danger of serious results, this is the most efficient agent, especially in streptococcus infection which is active you can use no better drug. Chinosol gauze, absorbent cotton, and soap may be had in the market. If you have an abscessed antrum, where pus is rapidly being formed, try chinosol irrigation, and chinosol gauze pack to control it, and you will be delighted.

I have shown you these cultures and tests, and called your special attention to these agents, not because they are the only good ones, but rather because I have had the most practical experience with them. I have used all of them on many hundred cases in the infirmary, and have the written history of treatments to corroborate all I have said. Some of you I know have tried some or all of these agents; others have not tried any. I simply want to make a plea for their value over the remedies you are using. Won't you try them?

I wish to extend grateful acknowledgment to Dr. Martin H. Fisher, of the University of Chicago; Professor Jacques Loeb, of the University of California, and Professor Frederick G. Novy, of the University of Michigan, for valuable suggestions, and to Dr. E. S. Willard, of the Northwestern University, for assistance in some of the work, and Drs. Cook and Dittmar, of University of Illinois, for like assistance.

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SOME PRINCIPLES UNDERLYING PORCELAIN INLAY WORK.*

By W. T. Reeves, D. D. S., Chicago, Ill.

There are certain facts and conditions in connection with porcelain inlays, and restorations, that clinical experience has demonstrated to be sound, conditions that the average inlay worker has accepted as such without trying to analyze and find out the *why?* And in working along in this blind way, he has jeopardized some of its strongest qualities as a tooth saving material, and in other ways, has lost entirely some of its best qualities.

I shall endeavor to point out some of these facts and conditions and to give my reasons why I believe they are fundamental principles. So much can be said in favor of porcelain, and so little proved against it, that it would seem that we had come to the *ideal* filling material that we have looked for all these years.

I am going to make this broad statement: There are scarcely any cavities where gold can be utilized, that porcelain cannot be successfully used, and there are so many places and conditions under which gold cannot be used, and where porcelain will be a perfect material with which to restore lost tooth structure, that I place it first in point of applicability.

I will not take your time to enumerate all the places porcelain can be used, but only some of the conditions where gold could not be used and where porcelain will do perfect service, and then some cavities where porcelain is the only material indicated, and which goes to prove a quality that porcelain possesses, and has not had accorded it.

Under the first will come the following:

For the young, in whose mouths gold fillings fail faster than cement fillings wash out, and where cement dissolves out so fast as to be dangerous, you will come very near doing permanent work with porcelain.

For the aged, whose strength will not permit the long sitting necessary for the insertion of a gold filling, you can do permanent work with porcelain, because you can divide the work between two or three sittings.

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*Read before the Minnesota State Dental Association, September, 1902.

For those bordering on nervous prostration, and those high-strung nervous temperaments, for whom it is a physical impossibility to prepare a cavity, event for a cement filling, to say nothing of gold, you can do permanent work with porcelain.

For those refined, sensitive natures, to whom the display of gold in the front of the mouth, is an ever conscious annoyance, you can confer a lasting benefit by the use of porcelain. and restore teeth to a condition so that persons at close conversational range would not know there are any fillings there.

In teeth that are loose from pyorrhea, you can do permanent work with porcelain, whereas you could not pack gold either by hand pressure, or mallet, and would have to resort to amalgam or cement.

The other condition which is by far the most important and which proves a quality that has not been credited to porcelain under its proper classification, and brings out the first point I want to make, are found in the following in which porcelain only is indicated: Extensive cavities where decay has encroached so close upon the pulp, that death of pulp would be almost sure to follow if filled with a metallic or cement filling, you can fill with porcelain with almost absolute security that the pulp will remain alive. Cavities in the buccal surfaces of molars and bicuspids at the gum margin that remain sensitive to anything hot or cold taken into the mouth, and cavities on the labial surfaces of the anterior teeth that are sensitive to the drawing in of a cold breath, when filled with gold, become perfectly normal when the gold is replaced with a porcelain inlay.

Accidents to the young, that result in the breaking off of a large portion of an anterior tooth, where it is desirable to retain the pulp alive, on account of the incomplete development of the root, can be restored to full contour and usefulness with a porcelain tip, and the pulp will remain alive.

In these and other similar cases, nature revolts at the introduction of any metallic or plastic material for the replacing of the lost tissue, but is perfectly resigned to the introduction of porcelain in the form of inlay or filling and resumes its normal functions and goes on its way rejoicing, and your patient does also.

What is the reason? *Compatibility of porcelain to tooth structure.* This is a quality belonging to porcelain that we have not appreciated, because heretofore we have had no material that possessed this quality. Compatibility of material to tooth, means a great deal; it means more than you realize at first thought. If nature could reproduce lost tooth structure, that would be ideal restoration. But nature cannot do this; art steps in with porcelain; and true art is where the artifice is hidden; the eye is deceived because it looks like all tooth, and nature is deceived because she thinks it is her own, and does not worry any more about it.

Compatibility. I want to emphasize this, and I want you al to give it some consideration on your return to your offices, that you may come to a full realization of what it means, that we have material that is compatible to tooth structure.

The definition of Compatible as given by the Standard Dictionary is: "1. Capable of existing together; congruous; consistent. 2 Being in harmony; mutually tolerant; accordant; congenial."

That a material could have these qualities, is something we have not looked for. In our search after an ideal filling material we have looked for one that would be easy in manipulation, permanent in lasting and preserving qualities, and harmonizing to its environment. What a discovery it would be if a substitute was found by some surgeon with which to replace loss and waste in other parts of the human body, a material that was compatible to the part it was substituting. It would be hailed as one of the greatest discoveries of the day.

That we have in porcelain a material that possesses this quality there is little doubt, also that the possibilities of porcelain are little appreciated today, as were the possibilities of electricity twenty years ago. And I predict that there will be as great an upheaval and displacement of present materials by porcelain, as there has been in the Industrial, Educational and Scientific world by Electricity, and that we are on the eve of the passing of the gold filling.

Compatibility may be the answer in part, as to why there is seldom or never any recurrence of decay about a porcelain inlay or restoration. Theories and scientific axioms are all right and are to be respected in so far as they are demonstrated, but in the face of practical demonstration or clinical facts, scientific axioms and theories have to readjust themselves. That it is a clinical fact that there is seldom any recurrence of decay around a porcelain inlay or restoration, I do not believe any one will gainsay.

Some, I have understood, ascribe a therapeutical action to th porcelain; this I do not believe; the lost tissue had no therapeutical quality, consequently the material to replace it does not need tha quality. That there is some reason why it is thus, there can be no doubt, and I will advance some theories of mine to let them stand until time has proved or displaced them.

Compatibility may, nay I believe it does, play an important part in this condition, but I believe there is another and more important condition: *Immunity.* I think I can best illustrate the position porcelain plays in this respect by likening the mouth to an island populated by an industrious people, the teeth in the mouth taking the place of the people of the island. Suppose the island is stricken by a scourge of smallpox and is being rapidly devastated; suppose that for every loss from this disease, one was imported who wa immune; in a short time the whole island would be free from this scourge. Now the mouth is being depopulated by caries. You will say that all the materials we use to fill teeth with are immune to caries. I grant this in the strict interpretation of the word, but with the exception of one they do not bring immunity to the mouth. If the persons imported to the island were those who had been successfully vaccinated, they would bring a certain protection to the island, but not immunity.

Porcelain brings immunity to the mouth; all other materials bring only protection, just as the vaccinated person brings protection only to the island. Gold either in crowns or fillings no matter how highly polished will tarnish and collect increasing amounts o food deposit. All other materials will collect and retain food deposits, and thus be an ever present menace to approximating toot structure.

Glazed porcelain will not retain food deposits, and is not affected by the fluids of the mouth.

I have always contended that an inlay should never be groun on any surface other than the occlusal surface of molars and bicuspids and the cutting edge of the anterior teeth. It is the practice of a great many inlay workers, after setting their inlay, to grin the surfaces to make it level with the plane of the tooth, and thus losing a large per cent of the quality of immunity. This is neces sitated by the use of low fusing bodies, which have a tendency to assume a spheroidal form in fusing, and thus makes grinding necessary; and by the users of high fusing bodies, over building or over contouring and not observing this before they remove the matrix. All grinding that is necessary should be done before the matrix is removed and then taken to the furnace and glazed again. The glazed surface of porcelain is a protection to surrounding and approximating tooth surfaces and brings immunity to a greater extent than any other material or agent we employ.

I have been asked to give the technique of porcelain inlays. will try and carry you through the different steps—and close b giving you what I believe is the true reason why inlays stay in.

It is almost needless to say that I am a strong advocate of high fusing bodies. By that we mean bodies that fuse above the temperature of 1840° F. or above the melting point of gold. Of necessity to use such bodies something fusing at a higher point than gold has to be used to form a matrix with. Platinum is the material used and platinum 1-1000 of an inch in thickness is the best and most desirable thickness for matrix formation.

In different places I shall quote in part from papers that I read before the Chicago Dental Society two years ago, and before the National meeting last year, and also from papers read before other State meetings this season.

Platinum 1-1000 of an inch in thickness is what I have always used and it has several points that make it superior to platinum 1-2000 of an inch in thickness. The very fact that it requires more work and care to burnish into the cavity will cause a more perfect matrix to be made when the work is acomplished; also it will have more stability and reduce the danger of warpage, while baking the porcelain, to the minimum.

The burnishing of the matrix I divide into four divisions or steps; needless to say that the burnishing at each step is repeated until accomplished, annealing each time the matrix is returned to the cavity. A piece of 1-1000 inch platinum is cut large enough to extend well beyond all the margins other than the cervical margin. After annealing in the Bunsen flame, place in position so that the surplus will be about equally distributed beyond the margins of the cavity. Take a piece of wet cotton or spunk and place so as to depress the platinum into the cavity, using a minimum sized round-nosed burnisher and adding additional pledgets of the wet cotton as the platinum is carried to place, care being taken that at no time are you in danger of the burnisher going through the cotton. At this step you do not attempt to turn the platinum over the margin. Remove the cotton and matrix from the cavity, and if your packing has been thorough, you will find the platinum has been carried to every part of the cavity and your margins are fairly well defined with little or no danger of breaking through the platinum. If you have broken through the platinum inside the cavity, no harm will result as the body will bridge across without danger of flowing through. If you have any surplus at the cervical margin that will press upon or hurt the gum while burnishing, trim away at this time. Anneal and return to the cavity for the second step.

Pack partially full of wet cotton but not over the margins; then, using any method that is easiest, turn the platinum over all the margins and down upon the tooth. To accomplish this I use a piece of ordinary twilled tape, passing it up so as to engage all portions of the platinum at once, then draw it in the direction that will cause the platinum to lap over the margins in all directions, thus bringing the folds equally distributed around the surfaces of the tooth, and fairly well burnish to the surface of the tooth.

Remove from the cavity and if the platinum has lapped over the tooth far enough to bind and hold into the cavity, trim away until the matrix will remove from the cavity freely. Anneal and return to the cavity for the third step.

At this stage your work is entirely upon the margins. The platinum that lapped over on the tooth will enable you to hold the matrix into the cavity securely enough with your fingers for you to accomplish this work. All wrinkles or folds must be burnished out and beyond the margins in both directions. It matters not if the matrix springs from one part of the cavity while burnishing upon another, although you will endeavor to hold it in place as firmly as you can; the next step will correct all faults of that nature.

I use the burnisher so that the head bears upon the margin cavity-wards and the shank upon the margin tooth-ward; in this manner you will burnish every portion of the margins until you are satisfied with their adaptation to the tooth. Also burnish the interior of your cavity so that your matrix will have as close adaptation in the tooth as at the margins.

It may be necessary for you to anneal several times before you complete this stage of the work, but do not leave this stage until it is thoroughly completed.

Now the last and final burnishing. For this burnishing I use a strip of rubber dam which is drawn tightly and binds the matrix into the cavity in all directions. You can now go over all the margins and surfaces and burnish out all the spring there may be in any part of the matrix. It is not necessary to spend as much time in burnishing at this stage as you did at the previous stage. You had practically secured your close fit before you came to this last stage, consequently about one-third of the time spent will be sufficient to give you close adaptation of all parts of the cavity and walls of the tooth.

Then comes the task of removing the matrix from the cavity without warping it. By patient and careful teasing you can accomplish this without any warping; if you are afraid that you have sprung it ever so slightly, dry out the cavity and dry the matrix; place it in the cavity and use the rubber dam again; this time it will tease out easily. The capillary attraction of the saliva between the matrix and the tooth will often hold it very tightly. Grasp the edge of the platinum at some point as far removed from the margin as possible, and where there is no fold to make it rigid, with a pair of laboratory pliers that you can lock; burn off the saliva in the Bunsen flame to avoid any possibility of gassing. The matrix can now be handled freely in building in the porcelain, for the bending of the platinum will take place at the pliers and not near the margins. At this stage, if desirable, the patient can be dismissed as there is no necessity of reburnishing any part of the matrix after having done a baking.

All inlays or restorations should be built up in layers and each layer baked by itself. By this method of building you accomplish three things; first, a translucent, natural looking inlay, for you can blend and subdue your colors and you cannot accomplish the same results in any other way. Second, by building in layers you break up the absorption and refraction of light rays, thus producing an inlay that looks 95 per cent the same from every point of view. Third, you prevent the killing of an otherwise good inlay, by preventing the showing from underneath of the cement the inlay is set in.

"For illustration of handling the body, I will describe the making of an inlay for a proximal cavity in a central incisor extending from the cervical or gum margin to and including a third or half of the cutting edge.

"You select some one of the several good bodies that are on the market to build what I call the foundation of the inlay; I use Close's body or Brewster's foundation. Have it finely ground, for it will pack more solidly, carve better and shrink less than coarser ground. Build it into the matrix little by little, jarring it down well to make it solid; build out the corner in excess of what you expect the contour to be to allow for shrinkage; when sufficiently dry that you can carve it, begin to carve and shape it up—so that you will complete this work before it is dry enough to crumble. Carve the lingual surface right down to the contour the matrix gives you, then carve away what would be the labial half of the inlay; carve it away right up to the matrix so that the room for laying on your colors will be the same at the edge of the tooth as any other part of the inlay. Bake this, and if you have estimated your shrinkage correctly you have practically an inlay for the lingual half of the cavity; if shrinkage has been more than expected, build on more of the foundation and bake again.

"You are now ready to build on the colors you want the inlay to be, and you can vary the shading from neck of tooth to cutting edge at pleasure. I never mix two or more bodies together to vary the shade of one, but depend on the thickness of the layer to give me the shade I want. You can get any shade of a given color by the thickness of the layer you use. I can best illustrate this by showing the effect of holding a sheet of colored glass to the light; you get a certain shade of that color, now; place another sheet back of it and you get a deeper shade of the same color and by adding more sheets of glass you get a still deeper shade of the same color. It is the same in using bodies; you can get any shade of a color by the thickness of the layer you use. Build your colors on in layers and bake each layer as you go along. When you have built your colors to almost full contour cover the whole inlay with a neutral color that will allow the underlying colors to reflect through; in this way you will get a translucent effect, and it is the only way that the translucency so desirable can be obtained. In the tooth you are trying to match, the colors are all in the dentine and reflect through the enamel; the enamel of all teeth is practically the same color—the different shades of teeth come in the difference in the dentine.

"All inlays, whether restoring contours or simple saucer shape cavities, I build up in layers and never less than three layers—foundation, color and enamel.

"Before stripping the platinum from the inlay, try into the cavity to see if you have the contour perfect, also to judge of the occlusion as near as you can by observation. (You could not have the patient close upon the inlay because previous to its being set it would be easy to fracture the porcelain. After the cement is completely crystallized a thin porcelain filling in the occlusal surfaces of molars will have the full strength of the whole tooth to resist masticating stress and is in no danger of fracture.)

"If your contour is lacking, build on more; if too full, grind and change as desired and return to the furnace to be glazed again."

Underlying colors are what you must look for in matching inlay to tooth, for the colors in the tooth are underlying, and just in proportion as you are able to see these colors and then are able to reproduce them in your inlay will you be successful in color matching.

Selecting the colors. Look for underlying colors. "It will surprise you when you look in this way at what you would say was a typical light yellow tooth, to see that there is either a gray or blue tinge or both down inside that tooth. You want those same colors in your inlay or it will not be a perfect match. Now I use the shade guide not to get a match for the tooth, but to help me in looking for the underlying colors and the degree of those colors.

"If you see yellow, brown, blue, gray or all of them, hold the shade guide to the tooth and determine the strength of these colors, also the order in which you will use them to give you the effect you want. Make a memorandum of this. For instance, you have a typical light yellow tooth you are making an inlay for; the cavity extends from neck to cutting edge, involving at the cutting edge third (more or less) of the width of the tooth. Yellow No. 2 on the Brewster shade guide looks to be a perfect match for the tooth, but at the neck you will find the yellow a little deeper, with a grayish tinge through the center third of the tooth and a bluish tinge towards the cutting edge; now you will find on looking closer that the blue seems to reflect through a gray and that there is very little yellow in this part of the tooth. My memorandum would read thus: Patient A; Foundation—Cervical, No. 3 yellow; Center—No. 6 gray; Cutting edge—No. 9 blue under No. 5 gray; over all No. 2 yellow with No. 11 for enamel.

"I would proceed to use them as follows: Build my foundation as described; the yellow, gray and blue would then be put in their respective places and baked as one layer; have the three bodies properly moistened and arranged on the slab so that you know which is which; take as near as you can judge the proper amount of each and place at their respective places; then a slight draw of a knarled handled spatula will draw the moisture to the surface and cause them to run together; cease instantly and you will have a perfect blending from one color to the other; if you continued to jar you would get a mixture instead of blending; allow it to dry and bake.

"You will find shrinkage will necessitate the building on of more of these colors and this time, as you want gray over the blue, you will only use No. 3 yellow and No. 5 gray; have the bodies ready and proceed as before; this will still further harmonize your colors because the yellow will extend still further down your inlay and modify the gray that was put on in the central portion, while the blue of the lower third modifies the gray so that when they are all covered with the lighter yellow you have such a harmonizing of colors that you cannot tell it from nature's work itself.

"If shrinkage causes any lack of contour, and it most always does and is really to be desired, cover all with a layer of Brewster's XX body; this is a new product and Mr. Brewster brought me the first to test a few weeks ago; you cannot say it is any particular color unless you call it enamel color; so far it seems to fill its mission perfectly. You now have a completed inlay that I believe comes the nearest to reproducing nature of any means or methods heretofore attempted."

I will close by giving you a law of physics that has not been understood or appreciated by inlay workers.

A dentist has been brought up all his life on the one law of self-retentive form of cavity and interlocking form of filling and it is hard for him or inlay workers to break away from that law. There are inlay workers today, who are working upon self-retentive forms of cavity formation, and grooving their inlays or baking into them platinum pins and loops to make them as near interlocking as possible.

I believe inlays depend upon the law of close adaptation for their strength of retention. Close adaptation and the medium of completing the close adaptation crystallizing under pressure.

You take two sheets of glass whose surfaces are adapted one to the other and place water between them to exclude the air, and complete the close adaptation and you cannot forcibly pull them apart. A joiner prepares the surfaces of two pieces of wood so that they are in close adaptation to each other and placing glue between them clamps them in a vise and leaves them to harden. If there was any appreciable amount of glue, there would be no strength of joint. There is no strength in the glue. It is close adaptation and the medium of completing the close adaptation crystallizing under pressure. I believe the close adaptation of inlay to interior of cavity as well as margins and the cement setting under pressure is the reason why inlays stay.

If this be true there is no need of inflicting the additional pain upon the patient or the complication of matrix formation that the other style of cavity formation would entail.

I hope I may have given you some ideas and principles, that if studied and followed, will lead to a larger and more extended use of porcelain as a filling material.

X-RAY AND HIGH FREQUENCY CURRENTS AS EMPLOYED IN THE RATIONAL TREATMENT OF PYORRHEA ALVEOLARIS.

By Wm. H. G. Logan, M. D., D. D. S., Chicago, Ill.

A comprehensive study of the treatment of pyorrhea alveolaris naturally divides itself into the consideration of its two most usual forms of presentation with slight reference to their causes. First: The method of treatment to be pursued where the primary causes are from the oral side of the membrane, while the prominent examples of these influences are, deposition of tartar upon the root beneath the free margin of the gum, mal-occlusion, and improperly fitted bands about the teeth for the purpose of holding partial dentures more securely.

These plus pathogenic bacteria give us the majority of the influences acting from the oral side with the result of partial or complete destruction of the surrounding structure about the neck and roots of the teeth.

The second form in this most broad division of this disease has reference to the changes that occur in the same structure, as the result of an alternation in the character and amount of nutrition brought to the part through the medium of the blood; and the changes in the system that frequently cause a disturbance in this area are as follows: Rheumatism, heart lesions, lead or phosphoric poisoning and kidney disturbances.

Before starting the treatments, take a history of the conditions as presented and record them in your case book reserved for this purpose, state in detail the firmness of the tooth, the amount of root exposure on all of its surfaces, general form and size of pockets, color and condition of the overlying soft structure, amount of recession, the extent of the involvement of the alveolar process and the causes producing the condition as near as the clinical aspect of the case warrants.

The various steps to gain control of this first form where the tartar is the most constant factor is to cause its removal from two to eight teeth at a time and restrict your attention to these parts for the present, because where extensive deposits have been thoroughly removed from a great number at a time it will expose to the irritating influence of heat and cold an abnormal amount of root and peridental membrane, whereas if you remove the deposits from a few teeth at a time this discomfort will be reduced to a minimum and a more perfect treatment is liable to be instituted.

The instruments best suited for this scaling will be found in the Younger set and a few angular formed push-chisels. The great difficulty of removing the small oval granular deposits found far down the side of the root can be greatly facilitated by allowing chemically pure warm lactic acid (after Younger) or five to twenty per cent solution of trichloric ascetic acid to bathe the part for a short period, this to be followed by the proper instrumentation that must result in the removal of all serumal and calcareous deposits from the root, and of equal importance is the destruction at the same time of the superficial layer of cells lining this abnormal functionating alveolar pocket; control the subsequent hemorrhage with 1:2000 adrenalin chloride before you endeavor to employ any medicinal agent in this infected part if you expect to get its full therapeutic value, and for the same reason you should employ dental napkins to prevent the saliva from passing into this area and decreasing the great germicidal effect of the one to three per cent solution of formaldehyde that is now carried into the dried field; next flush these pockets with some efficient warm antiseptic astringent solution that should be forced to the bottom of these openings between the roots under strong, steady pressure. If the destructive process has been extensive enough to allow considerable mobility of the teeth overcome this undesirable condition by the insertion of a metal splint that shall support them during the time of treatment.

It is believed in a majority of cases where the various forms of wire and thread have been employed they have acted in the line of a detriment rather than of a benefit. However, a few have been successful in their employment.

The operator will find the less frequent instrumentation is resorted to after thorough removal of the deposits has been accomplished the more rapidly his case will pass toward the desired end.

In the second form, where the primary influences seem to come from systemic derangement, cause all avenues of illimitation to functionate as near normal as possible and use the same local treatment or the parts of it as are indicated for the individual case.

We shall now revert to the closing of the first local, medical and surgical treatment that is to be followed by an exposure to the X-ray before the patient is dismissed.

Deposits upon the root and necrotic tissue lining the pocket have been removed, thorough irrigation instituted, hemorrhage controlled, under protection germicidal and astringent solutions have bathed the parts, and thorough examination of the conditions present has led us to decide if devitalization of the pulp, the correction of mal-occlusion or restriction of the tooth's mobility is necessary.

Because the above treatment had frequently given but temporary benefit of the suppurative and necrotic process in these parts in my hands and similar results following the treatment as outlined by others, I began the study of the electro-therapeutic uses of the X-rays and high frequency currents, and because I found that in lupus vulgaris, superficial carcinoma, in fact in almost all forms of tumors, its value had been demonstrated, and its unquestionable results in the treatment of chronic inflammatory diseases of the skin led me to believe that perhaps it might exert a beneficial influence in pyorrhea alveolaris.

For a short time the experimental work was confined to the mucous membrane about the teeth in the mouths of dogs. This precautionary measure was taken, for I did not know what the immediate or after effects of an exposure to the X-rays that should be long or frequent enough to have any therapeutic value would be in the treatment of this condition. With the hope of getting some light from the experience of others I had Dr. R. M. Ladova review the literature that pertains to the subject in the following languages: English, French, German and Russian, with the result that no statement could be found by him where the X-rays had been employed in the treatment of pyorrhea alveolaris or suppurative processes about the teeth.

The exposures upon dogs to a great degree were unsatisfactory for the reason of my inability to keep the dog's head in the line of the best rays; however, from these experiments I found that the mucous membrane about the teeth and anterior portion of the tongue would not have a resultant X-ray inflammation as quickly as the dorsom of the tongue and the posterior part of the pharynx or the cheek. In this preliminary work we learned the safe distance, length of the exposure and condition of the tube best suited to the mucous membrane about the teeth. During the days these observations were drawn, exposure from three to eight minutes' duration were made upon my own gums and the results recorded.

At the end of a few months' investigation I became convinced that the X-rays could be used with beneficial results in this disease without immediate or a subsequent ill effect to the tooth or adjacent structures if a given technique be followed.

So accordingly the exposures were transferred to the practical cases of pyorrhea alveolaris that had been of long standing and under the ordinary treatment many times giving but temporary relief, with the following pleasing results:

After three to six exposures, that constant dull, gnawing pain and sore feeling in the part that is characteristic of this disease in its advanced stage had changed so decidedly for the better that all of the patients with but one exception stated that their teeth felt more normal than had been the case for years, at the end of three weeks' treatment the patients frequently volunteered the information that hot and cold fluids had ceased to irritate the parts. But now to the more important questions: Did the X-ray and high frequency currents employed alone produce any change in the chronic inflamed tissue that was noticeable to the eye of the operator and patient? Did the suppurative process decrease? Did the teeth become more firm?

The deep red color that was present in all of these cases in the overlying soft structure that frequently extended the entire length of the root gradually changed to a greyish pink color that was quite similar to the normal, three weeks of treatment as a rule, producing a decided change in the chronic inflamed tissue.

In extensive suppurative alveolaris in no case did I rely upon the rays to combat the process alone, but employed it in conjunction with the medical treatment as described, and with the combination of the two I was able to get the pus discharge under control, not quickly but more rapidly than I had in similar cases in the past.

In answer to the question, Did the loose teeth become firm? let it be recorded both yes and no; most often, yes.

The technique of the exposures was as follows: The Crookes tube was excited by a coil capable of a twelve nich spark, the condition of the tube was neither hard nor soft, but medium vacuum the rule, the distance from the anode to the mucous membrane varied from eight to twenty inches, an adjustable lead screen thirty inches square suspended on wooden uprights with a three-inch circular opening in its center, that could be decreased at the will of the operator so that the ray will fall upon the desired area, is placed between the part treated and the tube, the position of the patient and the screen is determined by where the best rays can strike the diseased tissue.

In no instance did I let the ray first pass through the lip or cheek, for the reason a severe X-ray dermatitis would be the usual result before any beneficial change would take place in the mucous membrane, and if the patient chanced to be a man with a beard its temporary and at times permanent loss in the part rayed would be the result.

Therefore the lips and cheeks were always reflected and the rays coming through the opening in the protecting lead screen decreased so that they would first fall upon only the diseased structure about the teeth.

Where the pocket was extensive or in the main on the lingual side of the tooth, a higher tube was employed and the tongue was protected with lead foil held in place by the operator.

About the lingual surfaces of the posterior roots high frequency currents have been employed instead of the X-ray.

One to four sittings per week has been the frequency of the treatment and the duration of each exposure four to twelve minutes. A test exposure in every instance was made and patient not submitted to the rays again for a week to ten days for fear of an idiosyncrasy to the treatment that is sometimes present, or at least so claimed by certain authors.

In the summary, let a word of caution be sounded for those who may be tempted to take up the electro treatment in pyorrhea alveolaris, because of its many grave results in the hands of the unskilled.

No person has a legal or moral right to expose the human flesh to the rays who has not first read extensively and carefully the literature upon the subject, and then put himself in the hands of some expert, after which good judgment and great caution must be exercised if one avoids dire experiences.

At this time I do not wish to make any positive statements as to what I believe the ultimate position high-frequency currents and radio-therapy will occupy in the treatment of pyorrhea alveolaris. But do desire to positively affirm that in every case that has been under this form of treatment, a temporary benefit, which was superior by comparison in degree to that found when other forms of treatment were followed, was the outcome.

While its verdict to permanency should be withheld until time decides the question for us.

PROCEEDINGS OF SOCIETIES.

ODONTOGRAPHIC SOCIETY OF CHICAGO.

FIFTEENTH ANNIVERSARY CELEBRATION, MONDAY EVENING SESSION, FEBRUARY 16, 1903.

Dr. E. C. Kirk, of Philadelphia, Pa., read a paper entitled "The Saliva as an Index of Faulty Metabolism."

DISCUSSION.

DR. EUGENE S. TALBOT:

The paper is an able discussion of faulty metabolism in relation to excretions of the body. As a rule, scientists have paid very little attention to the saliva in this relation. The urine, perspiration and other excreta of the body have received more attention.

The essayist very intelligently has explained what metabolism means and the conditions incident to faulty metabolism. In my own experiments, I have followed him up to a certain point. in relation to interstitial gingivitis. This disease is due to nothing more or less than faulty metabolism. It produces inflammation of the gums and alveolar process with absorption and I believe is a surer and earlier sign of faulty metabolism than can be demonstrated by any excretions of the body.

The work Dr. Kirk has already done is certainly commendable. Should he continue his investigations, I am sure he will find metabolism of the human body has very much to do with other diseases to which the mouth is subject. I hope he will be able to demonstrate the changes that take place in the saliva and draw some conclusions with relation to the diseases of the teeth. It is very significant that there is much in dentistry besides the mere filling of teeth, and I think the time has come when, if our specialty is to be advanced, conditions of the body other than the teeth shall have to become familiar to us.

DR. J. P. BUCKLEY, of Chicago:

Like Dr. Talbot, I may say that this is one of the most scientific papers that I have ever heard. The particular feature I most enjoyed was the fact that Dr. Kirk has produced chemical results by means of using physical apparatus. Those of you who have experimented along chemical lines know how exceedingly difficult it is to make definite chemical tests from organic compounds, or from compounds of an organic nature. You can take inorganic compounds and test for them by means of chemical tests, but when you apply those same tests to ascertain the presence or absence of the organic compounds, the molecules of the compound are so complex that the mere testing with a chemical will destroy the integrity of the compound, and we will fail in our result. So I say, Dr. Kirk has produced chemical results here, not by chemical means, but by means of using physical apparatuses. It only shows us how the two sciences, physics and chemistry, are correlated, and how knowledge of one is beneficial and can be utilized in ascertaining results in the other.

Now, as we looked at the beautiful specimens that were thrown upon the screen, certain questions, I presume, flashed through all our minds, such as these: To what extent is the saliva an index to faulty metabolism? Of what value will an analysis of the saliva be in determining whether or not the proper chemical changes are taking place unassisted, whether the food we take into the system is being properly utilized? The saliva has not in the past been given the dignity or importance that it deserves. After experimenting somewhat along this line, although I have not dipped into the subject as has our essayist, I believe that in the examination of the saliva we shall have a factor, at least, in determining whether or not these processes are being carried on as nature intended they should be; but whether or not we shall be able by an examination of the saliva alone, excluding other factors, such as an analysis of the urine, the examination of the blood, or the clinical history of the case, to determine this faulty metabolism, I am unable to say. It will certainly be a means of clearing up the picture formed from the clinical history of the case; examination of the saliva will be a means of clinching the facts, so that we shall know more definitely about these abnormal conditions. It will be used in the same light, I take it, that the surgeon uses the X-ray. The surgeon believes that there is a condition present which needs surgical interference, and by the proper use of the X-ray that fact is definitely settled in his mind. So from the clinical history of the case, from the examination of the urine and of the blood, we may believe that there is a faulty process going on in the system, but by examining the saliva we shall be able to clear up or confirm the presence of that faulty condition.

Dr. G. V. Black, of Chicago:

I only wish to express my appreciation of the work that is being done and my great pleasure that it is progressing. I have been satisfied for a number of years that it was along some such line as this that we would discover those conditions lying back of some of the diseases which we have to treat, and I am still convinced that it is this kind of work that will finally do the most toward conquering that dread scourge, caries of the teeth. I can only express the hope that we shall have more workers in this field in order that we may progress faster.

Dr. Kirk (closing the discussion):

I want to thank this audience for the patient hearing they gave this very dry paper.

I was particularly pleased with the remarks made by Dr. Buckley, for the reason that I think it must necessarily voice an inquiry into the question, as he said, although most of us must admit that it is quite impossible for anyone to say to what extent this sort of work may be valuable to the dentist or to the physician in the study of disease. But certainly it is valuable, as Dr. Buckley has said, in connection with the study of the other bodily fluids as corroborative evidence. For example, in one of the specimens wihich I called attention to I showed a rounded terminal slot in the phosphate crystals. We have that condition in the saliva, and we know the disappearance of that peculiar formation means the termination of that pathological process which is concerned with abnormal loss of nitrogen from the economy in those cases. Again, as to the investigation of the saliva alone. In certain cases we have appearing in the saliva that compound which ordinarily is excreted by the kidneys—urea. Urea has no business in the saliva. Therefore I argue that the appearance of urea in the saliva in any quantity is an evidence of a pathological state, and in order to determine whether there is uremic poisoning by other methods, it will be necessary in the examination of the urine, for example, to make a number of long and thorough quantitative analyses to find out the amount of urea contained in the secretions, and by the study of these figures, in comparison with normal quantities of urea in the urine, we will arrive possibly at an understanding as to whether urea is being eliminated in sufficient quantity. But if we find it at all, under any circumstances, in the saliva, we know that saliva is taking up, as it were, the urea from the blood, and that there is an excess of urea being either made or retained in the blood. The saliva will have a special value as a means for answering certain questions with reference to pathological states. I think it is of great importance to us as dentists to know more about the saliva than we do at present. We should know the conditions of the oral fluids. They change from time to time in the same individual, and they are different in different individuals. Certain conditions of the oral fluids may be the cause of certain mouth lesions, and probably of dental caries. This is certainly a very important subject for those who have the time and energy to devote to its study. I am trying to propagate this gospel as much as possible, to stimulate an interest in the study of the saliva, and I say here publicly, if I can be of assistance to anyone, if I can answer any questions by letter or be of assistance in taking up this work, I shall be most happy to do so.

THE ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held at the Victoria Hotel, Nov. 18, 1902, with the President, Dr. E. J. Perry, in the chair.

President Perry delivered his address.

DISCUSSION.

Dr. A. W. Harlan:

This address contains enough to occupy more than one evening in discussing its suggestions. I do not know which part to devote myself to, but I believe that something with reference to the work of Professor Finsen may be of value. It is not a new thing for electricity or the various forms of its exhibition to be used in the treatment of disease, but to use electric light or any modification of it in dental surgery is very recent. When I first read of the use of the arc light in a concentrated state in the treatment of lupus and other skin affections, it occurred to me at once it would be a good thing to try it in the treatment of loosened teeth. But, I believe that in order to get the greatest benefit from the actinic ray we should scrape the teeth and remove the foreign substance from the roots. When I read a review of the histologic changes that take place after the use of the Finsen lamp, I was convinced that that aspect of the subject was the correct one to take; that there should be the surgical removal of deposits on the roots, or a cleansing of the pouches and pockets, and if there is any necrosis or caries, it should be burred or gouged away, and further than that, the light should be used in such a way as to produce a destruction of the granular and weakened soft tissues surrounding the root of the tooth. When we are treating a case of pyorrhea alveolaris surgically and medicinally we do two things: We remove the diseased parts and cleanse; then we use a corrosive acid or alkali as the case may be, to burn and destroy the weakened tissue, and have it exfoliated or removed, so as to get a new surface. Now, the Finsen ray is designed to accomplish what remedial agents, acids, and the alkalies are designed to do in the surgical treatment of loosening of the teeth. It is erroneous, in my judgment, to think that the mere surgical scraping of the root of a tooth or in the socket and around it alone will produce a cure, because many times the soft tissues have to be so altered by the use of acids, trichloracetic, lactic, sulphuric, hydrochloric, or a solution of ethylate of sodium, or a solution of chromic or some other acid, that they will burn and destroy. I have taken a loose tooth and scraped and gouged and dug and burred around it until I could with very little force have pulled the tooth out entirely, but have fastened it to its neighbor or neighbors and injected into the bottom of the pouch or pocket a solution of trichloracetic acid so strong that it would absolutely burn the whole interior of the pouch or pocket, and cause great pain. But at the end of about two weeks that tooth presented a totally different appearance. A recent author in the *British Medical Journal,* who speaks of the histologic value of the Finsen ray, says that this is an ideal method of producing tissue metamorphosis, and that the new tissue is produced at the end of twenty-one or forty-two days, which takes the place of the original tissue that surrounded the root of the tooth. Of course, it does not produce solidification and new bone in any such length of time; but it produces scar tissue which subsequently becomes solidified and concreted, so that it answers the purpose of holding the tooth in position.

I now have one of the new blue lamps, and expect shortly to have a complete Finsen apparatus in my office, and I hope to be able to report some successes with this method of treatment. I have tried the yellow and the white, and the red and pink lights, with little or no perceptible results; but with the actinic ray, the people I have used it on all seemed pleased and were unanimous in the opinion that the teeth became rapidly heated and the tissues extremely warm, and they all felt better. I did not use any medicines in any of these cases, except water to wash the pockets out. When I was treating the pockets in the mouth, I used medicine on one side of the mouth, and the light on the other. I think the light must be condensed, so that it can be brought directly on to the diseased surface for a sufficient length of time to produce a profound impression upon the tissues. It stands to reason that if you have looseness around the roots of teeth, if you remove all foreign matter, and project light with the actinic rays and get heat and light combined, a change will take place which will repay you for the trouble you have taken in trying to produce it.

Dr. J. W. Wassall:

I have done very little reading in regard to the use of electric light rays for the cure of disease, I have seen a few articles in medical journals, and I recall particularly Dr. Pusey's articles regarding the treatment of acne, carcinoma, etc., by means of the X-ray. I was under the impression that the rays could not be used for pathological conditions except when they were on the surface; that anything as deep as the pockets of pyorrhea cases, for instance, would be inaccessible, that the other tissues would be injured before the diseased tissue was reached. However, I am not clear on that point, and I devoutly hope that we shall get some results along this line which will be of value. I do not know of any branch where we need more additions to our power of curing disease than in this one particular affection.

The subject of inlays is one I am particularly interested in. I have spent much time on it, and I have had many conversations with Dr. Perry on the subject. His views and mine agree. I certainly agree with him that it marks a new era in the practice of dentistry; that we are equipped to cope with the ravages of decay and the restoration of lost tissue much better than we ever have been before, and I look for an enlarged use of inlays, and a lessened use of the ordinary methods of stopping or restoring lost dental tissue.

Dr. J. E. Hinkins:

The thing that has been interesting me a good deal for the past year, in following in the medical journals the treatment by the electric light, is this, that if we could have a reflector or condenser to concentrate these rays, have a prismatic reflector, of which we have many in connection with our buildings, to throw the light back, if we could reverse that and have a bulb made with a prismatic arrangement, which is a mathematical problem, to concentrate the light around the roots of teeth, we could undoubtedly get much better results. So I have been working with a gentleman who is one of the inventors of the prismatic lights for probably six months. I have in my possession one of these bulbs with which we can distribute or throw light at almost any angle we wish, and increase to 50 per cent the light power. We have done nothing as yet with the different colors. Whether they will interfere with the prismatic bulb or not, I do not know. I have not experimented in the mouth any, only to see if we can accomplish this condensation of the rays. If we can do that, then I will interview Dr. Harlan and see what can be done. This treatment appears to me to be very practical, because it is, apparently, an electro-chemical action which evidently takes place. In chemistry there are certain laws and certain affinities governing all chemical equations, and while Dr. Harlan was speaking an old chemical equation came to my mind. Probably you are all familiar with it. If. in generating hydrogen and chlorine gas, you put them into a glass-stoppered bottle and set them in a dark place, the two gases will remain an unlimited time almost, but just as soon as you expose them to the sunlight, hydrochloric acid is produced by the action of the rays of the sun. What relation these rays have to the rays of the sun is a phenomenon we do not know much about as yet. Some chemists claim that they can explain it; others claim they cannot. I do not know anything about it; but it does seem to me, if there is anything in fresh air and sunlight, in building up the system, there is certainly value in the electric rays in building up tissue around the roots of the teeth.

Dr. Brophy:

In the exposure of these gases to the sunlight, what part does oxidation play?

Dr. Hinkins:

Practically, there is no oxidation; it is reducing the chlorine and hydrogen gases to a liquid. With other compounds, where there is oxygen, oxidation cuts an important figure.

Dr. Truman W. Brophy:

To speak of the subject the President first mentioned in his address would be, perhaps, in a measure, to go over the ground we did at our last meeting, on the mission of the International Dental Federation as a factor in upbuilding the dental profession in all parts of the world. I have expressed myself before in regard to the importance of this body, and what it has already accomplished in bringing together the thinkers and workers in our profession from the different parts of the world, and I have also stated, in my opinion, that this body, through its representatives from all countries, will do more than any other organization can possibly do in developing to a higher plane dentistry in all its different departments. From a practical, theoretical and educational point of view, it has become a fixture in the minds of very many men who are interested in the teaching and treatment of general diseases, and those engaged in the general practice of medicine believe that hygiene is one of the most important parts of the work they have before them. They have come to know that no part of the body is so prone to be the center of infection and from which infectious material is distributed throughout the whole organism as the mouth, a part of the body which needs careful consideration, and the work of hygiene, as it is generally considered, in a medical school, should be directed towards teaching the best methods of cleansing and keeping in an absolutely clean condition the oral cavity. The mouth is the vestibule of the body. Infectious material developed in the mouth may, by absorption or by passing through the alimentary canal, pass into the system and become a poison to the whole body. And so the department of hygiene of the International Dental Federation, with Dr. Jenkins, of Dresden, as its president, we believe will accomplish a great work. If the International Dental Federation had no other mission than that it would be a good one. But it has other work to do, its most important being in the educational field. So I have no doubt as to the future of that body.

With reference to inlays, I do not know very much about them, but I feel that they are going to change, to a very great extent, certain phases of the practice of operative dentistry. Inlays will make it possible for the dentist to conserve his strength in extensive operations, and will enable the nervous, debilitated patient to submit to operations that will be of permanent value. Inlays, I hope and believe, will diminish to a very great extent the use of amalgam. Moreover, they will make it possible for the patient to have his teeth restored to their natural appearance, and avoid the disagreeable, the unsightly exhibition of gold. And so I think, with the expert, inlays will be of inestimable value to mankind. But inlays, too, will be, like everything else, in many instances, a failure, for the reason that skilled men are now writing about inlays and using them, so every dentist will think he can put in these inlays, and the result will be many failures, for the reason that many practitioners have not a knowledge of the underlying principles of inserting them.

Dr. Jenkins informed me in Dresden this last summer that almost every cavity of considerable size he now fills with an inlay instead of making use of amalgam in even a third molar tooth that has become badly carious on the buccal and distal surfaces, as it often does, and almost all of the large cavities he fills with inlays. Those of us who have had the great pleasure of visiting Dr. Jenkins in his office and at his beautiful home, can realize how it would have been difficult to have accomplished the great work he has under any other environment, because everything in Dresden suggests artistic work. Whereever you look in traveling through that city, the eye rests upon some beautiful work of art.

Just a word on light. It is not light alone that does the work as a therapeutical agent. A little while ago I was talking with a gentleman who has been using the electric rays in the treatment of disease for some time. I told him I had the pleasure of visiting Finsen's laboratory at Copenhagen, also the laboratory in connection with the London hospital, which, by the way, is the largest hospital in the world. Something like five thousand patients are treated there daily, so you can see something of its magnitude.

When we were in Copenhagen this summer there were gentlemen from America who wanted to drive over the city and visit the places of interest. That was all well enough, but I urged them to accompany me on a visit to Finsen's laboratory, and finally succeeded in doing so. When we entered this great institution, with a hospital containing about four hundred patients, with a clinic large enough to place from sixty to eighty patients under treatment at the same time, they were amazed, and we found there, as you find everywhere in Sweden, Denmark and Norway, many professional men who speak very good English. The surgeon in charge took us into the wards, then into the great clinic room, where there were an immense number of arc lights situated in different places, and from each great arc light five tubes are given off, and they are constructed in such a way as to concentrate the rays of light to about the focus of two inches. There was a nurse in charge of each tube and attending physicians moving from one table to another caring for and directing the treatment of the various patients. In that institution are the sons and daughters of wealthy parents, aged and young people, and even infants, undergoing treatment for various diseases—carcinoma, many of them; psoriasis, any number; scores of cases of lupus, acne, and eczema of infants. We all know that carcinoma has always been regarded as a malignant disease, and likely to terminate in death, especially if advanced. Furthermore, we know that psoriasis is a disease that physicians have always regarded as incurable. Of course they treat it, and by the time the physician succeeds in curing one place that is affected the disease develops in another. Most of the other cutaneous diseases are extremely difficult to control. We did not see any cases of leprosy there, but I am convinced that leprosy, taken in the beginning of the disease, can be successfuly treated by the electric rays, the same as psoriasis or lupus. I am satisfied this disease will be subjected to this form of treatment. In the treatment by the X-rays, you know it is necessary to cover the face with a lead mask, with the exception of the little opening through which the rays are directed upon the area of disease. The sittings average about twenty minutes, then the patient is removed. You see patients there who have cancer of the most malignant form absolutely cured. Epithelioma of the lip is amenable to this treatment.

I am curious to know what the electric rays will accomplish in the treatment of pyorrhea alveolaris, so-called, although I think alveolitis should be substituted in its place. We know that these rays are not purely light rays. They are chemical rays. They penetrate deeply the tissues, they oxidize or do what the nitrate of silver does, or other agents that are applied to pus pockets for the purpose of effecting a change. If it were not for the fact that we have in these pockets a new-formed membrane, oftentimes of a fibrous or semi-organized character, which we need to remove to promote the formation of healthy granulations, we would not use anything else. The rays of light will destroy bacteria; that is what the various agents referred to by Dr. Harlan will do. If we can by the use of the actinic ray, or by any form of electric light, produce oxidation of these germs and destroy them, thus permitting nature to institute the process of repair, how much better it is than to use agents which will destroy certain granulations absolutely!

Electricity in the form of electric rays is today claiming more attention than anything else in therapeutics, and electro-therapeutics, while it is now in its infancy, is destined to become the most potent factor known to mankind for the treatment of disease.

Dr. Elliott R. Carpenter:

There is only one phase of the paper that I feel competent to speak upon intelligently, and that is with reference to inlays. I take great pleasure in reporting a case of a gold inlay put in five years ago by one of our highly respected members who is not present tonight—Dr. Ames. It became necessary to remove the inlay on account of a dying pulp, and it was no easy task to do so. Upon removal of the inlay, I found the cement under the margins to be absolutely intact, without any signs of chemical destruction. I simply report this case for Dr. Ames and as an argument for inlay work. It would indicate that in an inlay, which is perfectly fitted and adjusted at the margins, there will only be a limited amount of dissolving of the cement under these margins.

Dr. L. L. Davis:

The President has spoken of three of the most notable events of the last year, and, to my thinking, in the next year we will have even stronger reports to make; that we will have a greater number of new things to speak about. We are just on the eve of some of the most remarkable achievements in dentistry.

This electric or X-ray method of treatment, while it is so new that few of us have had an opportunity to do anything with it, promises a good deal. There are lots of cases of small growths of the gums that can be removed by this method, but which at the present time can only be removed by the knife or cautery.

As to inlay work, we know it has come to stay. It is the most beautiful work we turn out. It is the thing that we have been looking for for years, and in these ideal or well selected cases where it should be used, the results are gratifying. I am not so radical as to think that it should take the place of every metal filling, or that we should take out every metal filling and put in inlays, but in the ideal cases, where it can be used in a proper way, inlays are the only things to use.

Dr. C. S. Case:

I have been very much interested in the paper of Dr. Perry, and especially in the discussion.

In regard to the several subjects that have been presented, I wish to speak particularly of inlay work. It has been my fortune to come in contact with considerable inlay work; I have had an opportunity to see some very good, and some very poor, work. So far as the work itself is concerned, the most important part is the coloring. The inlay work itself, the mechanical part of it, can be accomplished as well with gold as with porcelain. But where it is possible to get a perfect color in the inlay it is the most beautiful work I have ever seen. In a number of cases that have come under my observation, the inlay seems to change color or else the tooth itself changes. In many instances where the inlay had been perfectly satisfactory to the operator and to the patient, so perfect in color when it was inserted that it was impossible for the most expert person to detect a difference, in a year or two there would occur a marked change. In one instance an inlay restoring the mesio-incisal corner of a central incisor that was inserted for a young man in Paris was so perfect in color that I did not myself notice that there was an inlay there in taking an impression until my attention was called to it by the patient himself while I was taking measurements for bands. It was quite a surprise to me. He said, "Be a little careful with that inlay; the dentist who inserted it spoke of it as being somewhat imperfect in color." I never saw an inlay more perfect in color in my life. He then told me that when the inlay was inserted there was quite a distinct difference between the inlay and the color of the tooth, so much so that the dentist was dissatisfied with it. It had come back to the natural color of the tooth.

Recently I have been working for a young lady who had a very large inlay in a lower molar. She told me that when it was inserted, it was perfect in color. Now, it is distinctly off-color, although the inlay itself is very perfect.

Dr. C. N. Johnson:

I am reminded of a remark made at our last meeting by Dr. Harlan, who, in opening the discussion on the paper of the evening, said that "Time is a great leveler." That fact impressed me forcibly tonight in regard to the three principal topics mentioned in the address of the President. It applies to the work of the International Dental Federation; I think that time in connection with the development of that organization will level many things which seem now to be in an incongruous condition. The tendency toward international thought will level many of the matters that need leveling in the profession of the different countries of the world.

In regard to inlay work, it applies equally as well. There is no doubt but what inlay work has come to stay. Some members of the profession are undoubtedly running to extremes in its use, showing a lack of judgment in its application in some instances; but, it seems to me, the months and years that go by will level all that up, and inlay work will finally reach its normal and legitimate status.

Dr. Carpenter mentioned the excellent service that had been given by an inlay which was inserted by Dr. Ames. Some years ago it was my privilege, during Dr. Ames' absence from the city, to be called upon to remove one of his inlays for a patient whom he had referred to me, and I had the same difficulty in removing that inlay that Dr. Carpenter had in his case.

Within the last week or two I saw a gold inlay on the disto-occlusal surface of a lower molar, that I inserted about thirteen years ago. I did not know so much about making inlays then as I do now; the work was not as perfectly done. However, that inlay has done comfortable service all that time. I have had to reset it once; it was loosened by some adhesive candy that the patient had been eating. It gives as good promise of lengthened service today as it did when it was inserted. Inlay work, judiciously used, is a great blessing.

In regard to the actinic rays for the treatment of pyorrhea alveolaris, I believe there is danger of going to an extreme in that as well as in other things that are brought to our attention. I feel, as Dr. Harlan has intimated, we must not labor under the impression that it is unnecessary to remove deposits from the roots of teeth when these rays are used in the treatment of pyorrhea alveolaris. I feel sure that with the use of any agent, medicinal, therapeutic or otherwise, without taking the precaution of thoroughly removing the deposits from the roots of teeth, we will not be successful. This brings us back to the same premises that time is a great leveler. We must look at these things from the broadest possible point of view, and not become wedded to any one idea.

Dr. J. G. Reid:

This address is commendable, thoughtful and timely. The subject that apppeals to me particularly is the interest manifested throughout the various countries in regard to a better and higher education for the dentist, and this will be brought about by the commingling of people from various countries, in expressing and interchanging their ideas in regard to dental education. That is what the International Dental Federation aims at particularly. It is an organization that ought to result in accomplishing a great deal of good, and I hope to live long enough to see the results of the work of that organization.

CHICAGO DENTAL SOCIETY.

A regular meeting was held in the Schiller Building, Jan. 6, 1903, with the President, Dr. Elgin MaWhinney, in the chair.

Dr. George W. Cook read a paper on "Antiseptics and Disinfectants."

Dr. Elgin MaWhinney followed with a paper on "Germicides—Some Dental Uses."

DISCUSSION.

These two papers were discussed jointly.

Dr. G. V. Black:

In the absence of those who were expected to open the discussion on these papers, I will simply say a few words and then leave the subjects to others.

It is one of the most interesting fields in which we can work; at the same time, it is one of the most abused fields of all medicine, on account of the great anxiety in the minds of the many to use remedies that will destroy germs. It seems to me sometimes, that the whole world is trying to force germ-killers upon the market; therefore, we need far more careful, conscientious, painstaking experimental work by members of the profession who are not anxious to make money by placing germ-killers upon the market. It is from among ourselves particularly that these experiments should come; consequently I am very glad indeed to see these papers come before you for discussion.

As to the use of germicides, there are certain uses to which they should be put in the sterilization of hands, instruments, infected clothing, and various other things, but it is very rare that we should use or attempt to use a germicide in medicine or an agent in the potency of which it will act readily as a germicide. I have seen a few cases in which the radical use of an agent that would destroy was justifiable. One of these was a case in which a leg had been amputated high up, in the hope of getting ahead of hospital ganggrene. The next day but one, a small spot of gangrene was discovered upon the lips of the wound. I pumped the tissue all around full of salicylic acid, dissolved in ether, and saved the man's life. The whole tissue pumped full sloughed out, but there was no more gangrene. The result proved that that was a good use to make of such an agent. Another agent that would not spread to the general system more than that and cause general poisoning might have been used. I might have used carbolic acid; I might have used various other agents in the same way, but here I used an agent to destroy, and the rule should be if we use a germicide it should be used for the purpose of destroying. What we usually term an antiseptic is something different and should be differently understood. It is an agent used to restrain, and using agents to restrain, of course, is something different from the literal meaning of the word antiseptic, but is is generally used. We use an agent to restrain, and here we do not use it with a view of killing. Now, an agent that will act more vigorously upon the vegetable cell than upon the animal cell is the one we wish to select for this purpose.

I want to call your attention particularly to what the essayist said about the choice of agents with reference to their effect upon the animal cell. This I regard as a most important feature. We are too much in the habit of saying that this is a powerful antiseptic or this is a disinfectant; let us use it. Then go ahead without reference to its effect upon the tissue on which it is used, or upon the animal cell. That is all wrong. The effect on the tissue should be looked to with the greatest care. I remember one case (I have spoken of this before to some of the members of the Society) in which a load of shot struck a boy's arm, passed through, and came out very near the elbow, tearing out bone and muscles, leaving but a ribbon, so to speak. On examination, we found the radial artery was all right; the hand was nourished. An effort was made to save the arm, or part of it. It was placed in a bath, in which some carbolic acid was dissolved, kept at the temperature of the body for weeks, but there was no reparative process. We speak of carbolic acid as a stimulant; if we can get a reaction, there is some stimulating property, perhaps, but it is exactly the opposite of a stimulant upon the animal cell. It prevents development; it prevents healing. If we want to quiet things down, we may use carbolic acid. Sometimes it is a good agent to use, but more often we want something that is more stimulating to the tissues, as well as something that is restraining to the growth of microörganisms. We took the arm out of the carbolic solution, placed it under different conditions, and slowly we got a reparative effect. We did not have microörganisms or suppuration to bother with, but we had to get different conditions in order to obtain repair. I should advise very strongly that we do not undertake to use in our work agents that are intensely irritating or even very considerably irritating. We are not justified in putting such a drug as oil of cassia, for instance, into the roots of teeth, unmodified, because of its irritating effect. We are not justified in using some other agents that have been spoken of this evening in the roots of teeth. I should not like to use formaldehyde in the roots of teeth, an agent that is so poisonous to animal tissue. Of course, we may use formaldehyde to disinfect a room or to disinfect clothing, etc. Where we want to destroy, it is well enough to use it; but for therapeutic uses, let us use an agent that is not so irritating, that will not destroy tissue or produce inflammatory results, etc.

I wish to make a plea that we be judicious in the selection of agents, looking to their action upon the animal cell. Arsenic is a good disinfectant. Why don't we use it? Because we know so well that its action upon the animal cell is greater than its action upon the vegetable cell. Therefore, we would not use it for that purpose. Let us look to other substances, and use those that restrain, not look for those that kill for use as medicines. I would not go so far as Dr. MaWhinney does in some of the uses he speaks of with certain drugs, although I accept most of the recommendations contained in his paper. The use of drugs in an experimental way in order to learn their effects, good or bad, is very important. They should be carefully tested in the laboratory, in order that we may better understand their effects before using them in the office. But for the general work of practice the careful selection of a few agents (and we should never be confined to one or two, as they are required to get the effects we want under different conditions) is to be recommended, and a careful letting alone of the whole multitude of nostrums or the agents offered on the market. The different conditions under which we find microörganisms, and the different conditions under which a vast amount of experimentation has been made, as the paper relates, have caused an immense variation of opinion to be expressed by different men in regard to these agents. Do not be carried away with such agents. A few of the more simple remedies, well chosen, and used in the places in which they belong, will do you far more service.

Dr. L. H. Arnold:

There is a preparation on the market which is really a saccharine coal tar product, sold under the name of granatose, by some New England company. They claim it is absolutely antiseptic, non-toxic, and it is considerably used in tooth powders and tooth pastes. I would like to know whether the essayists are familiar with this agent, and of its value as an antiseptic.

Dr. Truman W. Brophy:

The papers that have been read this evening have interested me very much. The Society is very fortunate indeed to have had two papers in one evening such as those we have just listened to. They interested me particularly because they teach so much, and I think that the most important matters for us to consider are those which will enable us to better take care of our patients. If there is anything of more importance than any other one thing pertaining to our whole life-work, it is that. We often hear papers that are delightful in composition, most beautifully presented, that deal with subjects that are not so practical as those we have listened to this evening. It is true, papers of a more theoretical character are necessary, because they lead us into thought; they bring out material that is of practical value. To attempt to discuss either one of these papers would be with me an impossibility, so far as going into details is concerned. But what we want, what we expect, and what we will get as an outcome of papers such as these is something we can tie to, that will enable us to better care for our patients.

If I am permitted, I will say a few words about antiseptics and disinfectants. An antiseptic is an agent that has the power of preventing decomposition of the tissues. If its prevents sepsis, it will prevent decomposition of the tissues usually, unless in a case of cut-off circulation. If you cut off circulation to a part, you get destruction, no matter what agents you use. In the treatment of a condition we may use an agent that will prevent sepsis; that is, an antiseptic. If we have a condition which requires disinfection, it is a different matter. We have the products of decomposition to deal with, and we need an agent that will destroy the products of decomposition. There are many agents that will prevent decomposition, but will not destroy the products of decomposition. So an agent necessarily is not a disinfectant that is an antiseptic. Carbolic acid will prevent decomposition. In strong form it is really an anesthetic. It will prevent decomposition; it will serve as an antiseptic, but it will not destroy the products of decomposition. It will not render an offensive agent inoffensive by its action; therefore, it is not a disinfectant, but it is an antiseptic.

I regret somewhat that Dr. MaWhinney made no reference to a class of remedies that have been used, I might say, from time immemorial—the silvers and their application in surgical practice. Many years ago, when the coal tar products were being evolved, for a time they seemed to take the place of the silver preparations, and nitrate of silver for a little while was almost laid aside by many practitioners of surgery. But I remember that surgeons returned to its use, and I think it is absolutely true that in most of the European countries nitrate of silver is used more today, or some of the preparations of silver, than ever before. So reliable is it that various preparations have been made from it. Protargol is an agent that is being employed quite extensively in hospital practice. Albargin, a white preparation of silver, is another agent which has been used extensively. But recently, within the last three months, a new preparation has been brought out under the name of argyrol. I am not acquainted with the manner of preparing these different preparations. I cannot tell you anything about that. But what I know of this agent and of others is based on clinical experience, and on the observations and clinical work of others, together with the reports that have been made by a number of intelligent physicians engaged in private and hospital work, and I am satisfied that in the last of the three preparations I have named we have an agent that serves our purpose better than any heretofore presented. Argyrol, in twenty per cent solution, has enabled me to arrest suppuration which has resisted the action of bichloride of mercury, one part to a thousand. It has likewise resisted the action of protargol in twenty per cent solution, and of various other agents of a milder form previously used; yet, with a twenty per cent solution of argyrol I have arrested suppuration in forty hours in a case of extensive ulcer or breaking down of tissue.

Professor Hotz, of this city, has used argyrol in the eye in fifty per cent solution, and he uses it not infrequently in cases of gonorrheal ophthalmia with satisfactory results. I have never employed so strong a solution as that, but a twenty per cent solution seems to have served every purpose.

Of the two agents that Dr. MaWhinney told us about, that which impressed me the most was what he said last in regard to the action of chinosol, in that it has the merit of being a non-irritant. That I may say of argyrol. If this agent (argyrol) is noted for anything in particular, it is that it does not produce irritation of the tissues. Chinosol, as Dr. MaWhinney says, does not produce irritation, and why should we attempt to make use of an antiseptic that will produce irritation, when agents, such as chinosol and argyrol, will satisfactorily arrest suppurative processes in the tissues without irritation?

I am not familiar with many of the agents referred to in a clinical way in the papers that have been read, so that I cannot discuss them from that standpoint. But I propose to make use of some of these agents, especially chinosol, because I consider it of far more value than any of the others mentioned.

He did not say much about peroxide of hydrogen, pyrozone, and the oxidized remedies. Some of these agents have done more harm than any we have at our command, as remedial preparations. They have done harm because they are put into cavities containing pus, and by the rapid process of oxidation and elimination of gases they will force themselves through the tissues, penetrate deeply, and carry infection to places where it never would have gained access if these agents had not been employed. I have had a case in my clinic where the whole inferior maxilla has been lost, resulting, in my judgment, from the unwise use of peroxide of hydrogen, carried into the abscess cavity, passing out through the external plate of the bone, passing under the periosteum, and dissecting it up from the bone back an inch and a half or so, carrying pus in its track, establishing infection which resulted in the loss of that bone. I have known it to have been thrown into the antrum, pass through and around the bones, resulting in extensive destruction of the bones and tissues in this location. I have often thought it would be a good thing, although it is a valuable agent in some places, if we could discard it from the list of remedies employed. Although I consider it valuable in certain cases, I use it seldom.

If I am permitted, I want to go back to argyrol. I want to state what occurred when I first became familiar with it. I asked Mr. Sargent, the druggist, to put up some for me. I asked him if it was true that it was soluble in water alone. He said, "I will show you." He took some argyrol and put it in a vessel containing water, with protargol in another vessel, adding the same quantity of water. The argyrol, almost as promptly as would the chloride of sodium, went into solution, while it took him about fifteen minutes before he could make a solution of protargol. It seems to me, that was a strong argument to prove that argyrol will penetrate the tissues more deeply than protargol, and this has been the experience of men upon whose judgment I can rely as being accurate. It will penetrate more deeply into the tissues, and thereby destroy infection, which is deep-seated, better than any of the other salts of silver.

Dr. E. M. S. Fernandez:

I wish to say just a few words; particularly with reference to two agents mentioned, namely, pheno-sulphonic acid and chinosol.

A patient presented with a discharge of pus from the gum where the teeth had been extracted by a specialist some years previous. Later she was treated by two good physicians with little or no benefit. She became alarmed and came to me. I called Dr. MaWhinney to assist me with the case. After exploring to find the seat of trouble he packed the tissues with gauze saturated in phenosulphonic acid. This agent soon destroyed the necrosed bone and a little later a large portion of a root of one of the bicuspids which was completely covered up in the tissues came away. It was completely decalcified, resembling cartilage, but retaining the original shape. An aristol dressing with gauze packing was changed from time to time until completely healed. This was over four months ago. I have seen the patient within a few days and no trouble has recurred. I wish to recommend that as an excellent agent for this purpose.

The other preparation is a ten per cent of chinosol, which I have found very useful in cases of chronic abscess, and in such cases as we have very often where the tooth has no fistulous opening, but gas has formed. As soon as you seal in medicine in such a tooth it causes pain, and it becomes imperative to open it up. In these cases I have washed the parts clean with alcohol, dried them carefully, then poured into the root canals a ten per cent solution of chinosol, closing the canals with cotton or gutta percha allowing them to go from six to ten days, and to my great surprise they have given little or no trouble. Sometimes there may be a little pain, but after using some counter-irritant it will disappear. After giving two or three treatments to a tooth in that condition, I have filled it, and the patient has had no trouble whatever. I have used it in washing out pockets in cases of pyorrhea alveolaris, with great success.

DR. G. W. DITTMAR:

During the winter of 1899 and 1900, it was my privilege to watch Dr. MaWhinney and Dr. Cook perform a number of experiments similar to the ones that they have detailed this evening; with most of the medicaments mentioned. A few more have been added to this evening's list. I know the technique they observed, and the care they took in performing these experiments, were as skillful and painstaking as they possibly could be.

Regarding the agents, chinosol and trikresol; at that time they were found to be by far the best antiseptics, we put them into use in the infirmary of the Illinois School of Dentistry, and I had the pleasure of observing clinically the action of these medicaments, chinosol in particular, and every word Dr. MaWhinney has said I can corroborate.

Trikresol is more irritating than chinosol, which is practically a non-irritant. I have used chinosol in the treatment of putrescent root canals, blind abscesses, fistulous abscesses, pyorrhea alveolaris, etc., with good results.

As to the statement made regarding bleaching of teeth, I have seen several cases where chinosol discolored the crown of the tooth, due to its being used with steel broaches, but the action of twenty-five per cent etherial pyrozone was very good, bleaching it perfectly. I know that to be a fact from clinical observation.

Dr. Fred. B. Noyes:

We have to deal very largely with a biological problem in the treatment of infection. The essayist stated that there were three factors to be considered, the number and kind of the microörganisms infecting, the resistance of the tissues, and the general systemic condition. Necessarily, the essayist dealt primarily with the treatment of the infecting agent, or the chemical destruction of the infecting agent. In the writings on disinfectants and germicides, even as applied to the treatment of infections, that has been almost exclusively the point of view. I want to emphasize the reaction of the tissues. In the case of boils, with which we are most familiar, perhaps, we know that if they are left alone the tissues will eliminate the infection; in other words, that that one element of tissue resistance will act as a germicide or as a disinfectant, will eliminate the infecting microörganisms from the system. That phase of the subject has not been studied very closely in the laboratory. We have not a very clear history of the reaction of the tissues, and I have for some time thought that this phase of the subject will come more prominently into view; in other words, that we will put the two things together, and study with the action of the disinfectant and of the infecting agent the action of some remedy upon the tissues in its relation to the same end.

Dr. J. G. Reid:

There was one thing I was pleased with, and that was the idea which is expressed in the papers of our knowledge of physiological chemistry. I read a paper in 1886 on physiological chemistry, and while I did not revolutionize the world, by any means, it was simply a corroboration of the views and problems that have been presented in the papers tonight. We must have a clear knowledge and understanding of physiological chemistry, and until we have mastered that problem we shall not make much progress, but when it is mastered, we shall have reached probably the top notch of treating diseases.

I have not had much experience with the drugs that have been mentioned—the coal tar preparations, which are most prominent in view. I have had a little experience with some of them. I have had some experience with chinosol, which has been satisfactory. The only objection to it is that it discolors the tooth. However, after what has been said tonight, I have a little more confidence in it, because it has been an agreeable agent under such circumstances as I have used it. I have discarded it in a measure, because of that fact of discoloration of the teeth. I do not remember within my reading of it having been referred to as bleaching a tooth with pyrozone after the use of chinosol. This is practically a new idea, and makes its use more satisfactory and agreeable, because it is a potent agent. I shall try it again, and if it works all right, I will stick to it, because I have considerable faith in it.

Dr. Brophy brought the matter of the use of argyrol before the Odontological Society some time ago, since which time I have tried it. I find it a nice agent to use.

The papers this evening have been excellent. They have furnished us food for thought. We have all learned something. They have shown the value of these agents, and it would seem, after what has been said, that the essential oils have gone to the devil, and we have got back to something else. We may not hear anything more of the essential oils for the next four or five years.

I am really very thankful, as a member of this Society, to have been present and heard these two papers.

DR. J. P. BUCKLEY:

I am not prepared to discuss such scientific papers as those that have been presented tonight, but I wish to discuss certain phases of them. I was particularly interested in that part of the papers where they dealt with the late idea of making solutions. Before we can understand the chemical action of disinfectants or germicides, we must know what takes place when these substances pass into solution. Only a short time ago most chemists thought that a solution was simply a blending of the molecules of a solid, liquid or gas, on the one hand, throughout the molecules of some liquid, on the other. But now they have discovered that we do not have simply a blending of the molecules when a substance passes into solution, but we have a disassociation of the radicals which compose the compounds, and the radicals are what we call ions, as was clearly explained in both papers. Dr. MaWhinney especially explained that. Let us take carbolic acid, which has been spoken of so much this evening in both papers. When we dissolve carbolic acid (C_6H_5 OH) in water, we do not have a blending of the molecules of the carbolic acid throughout the molecules of the water, resulting in a clear liquid, but we have a disassociation of what we call in chemistry the radicals. We have the phenol radical (C_6H_5)—with its valency unsatisfied and the hydroxyl radical (OH)—in the same condition.

Dr. Brophy told us that argyrol was freely soluble. The reason why argyrol was more active than the other substance mentioned, protargol, is because we have in that solution a disassociation of the ions. These ions, seemingly, are charged with positive and negative electricity.

Let us consider for a moment the action of these germicides upon the cell. The papers brought out clearly the relation that exists between the vegetable and the animal cell. Dr. Black also explained this clearly. Every cell, whether it be vegetable or animal, whether it be found in a uni- or multi-cellular organism, depends for its life and vitality upon a physio-chemical substance, a concentrated protoplasm, if you please, called by some nuclein, and by others nucleinic acid. We will consider the conditions then necessary in order to produce disinfection. There are four, all of which have been mentioned several times in the papers and discussions. First, we must have a germicidal agent; i. e., one which has the property of destroying bacteria. Second, this germicidal substance or agent must be used in a sufficiently concentrated solution to kill microörganisms. Third, this germicidal substance must act in the absence of all substances which tend to neutralize its action. Fourth, it must be in contact with the microörganisms long enough to kill them. Now all germicidal substances that act chemically are poisons, and any one that is used in a sufficiently concentrated solution to destroy the life of the bacteria will also destroy the physio-chemical substance in the animal cells. Let us take the third condition. These germicidal agents must act in the absence of all substances which tend to neutralize their action. We can take a certain culture infected in the test tube, and we can have germicidal substances act in the absence of other substances which tend to neutralize their action; but when we take the same solution and introduce it into the mouth for the treatment of teeth, etc., we have other conditions to consider. There is albumen, a normal constituent of saliva, and other proteid substances found in the mouth. The germicidal substances act upon these as well as upon the bacteria. So we have the solution neutralized, in a sense, in the mouth, and it does not produce the same result that it does in the test tubes. Let us take the fourth condition. These substances must be brought in contact with the microörganisms a sufficient length of time to kill them, and, as Dr. Black explained, if we hold these substances in contact with the vegetable cell long enough to destroy it, they will produce a great deal of harm in the animal tissue. If we consider this matter thoroughly, we will find that the disinfection of tissue is almost, we might say, an impossibility, that is, to properly disinfect without destroying the tissue itself, killing germs without killing the animal cell, so that the subject of disinfection or of sterilization is a much more extensive one than some of us think it is.

I hope the members will read and study that part of the papers which referred to the ionization theory, because it is very interesting and should be understood.

Dr. J. G. Reid:

I would like to ask the essayists, in closing the discussion on their papers, why we should use the word disinfection at all. Personally, I do not see any reason for using it, and I bring this point up because I want the question answered.

Dr. W. V.-B. Ames:

I desire to say a few words in connection with these papers. I believe Dr. Buckley made the statement that up to within a year or so this theory of ionization was new. I cannot reconcile myself to that statement, because in electro-therapeutics ionization has been recognized many years. Furthermore, in cataphoresis, as we call it, the thing simmers itself down to ionization.

Dr. Buckley:

I meant to say that it was comparatively new.

Dr. Ames (resuming):

I have been to many meetings of dental societies, but I came here this evening to hear these papers, because of the personality of the essayists, and because I am extremely interested in these subjects. Like Dr. Brophy, I may say that I am slightly silver salt daft. Yesterday I had lunch with Dr. MaWhinney, and asked him what results he had obtained with regard to the use of silver salts. I wish Drs. MaWhinney and Cook would tell us whether, in their experiments, they have tried the growth of these bacteria upon metallic surfaces, to determine what the effect would be on the byproduct, or what the excreta of the microörganism is upon the metal which is producing metallic salts which react upon the organisms. This may seem a little foreign to the papers, but with me it is extremely interesting, because for some time I have believed that it is possible to place within the roots of teeth as root fillings either a specially prepared silver precipitate, or the oxide of silver, or a mixture of precipitate of silver and oxide of silver, or, in other words, a silver precipitate which has upon the surface a silver film of oxide which will serve as a sterile root filling.

Dr. J. E. Hinkins:

I did not intend to say anything upon these papers. I do not agree with Dr. Reid that the essential oils are going to the bad. While I am not an essential oil crank, and never have been, I can state from my work in chemistry and from my experiments, that these oils are of great value. Dr. Cook made a statement in his paper that a substance must go into solution before it can be acted upon by the remedy. The reason why the essential oils did not make a better showing on agar agar and other culture media is because they had to go into solution, and the oils act on the water in the substance before we can get the antiseptic properties; that is the reason it took Dr. MaWhinney so long to obtain this action. While I believe in the silver and other salts, I still think there is a permanent place for the essential oils in dentistry.

Dr. Cook (closing the discussion on his part):

Many points have been brought out in the discussion that are interesting to me. Dr. Buckley brought out some good points in regard to solutions. In my paper I simply alluded to that phase of the subject in order that I might be more clearly understood in regard to other points. It is a subject regarding which very little is known, so far as the therapeutic action of drugs is concerned. Just what their action is, and the affinity the ions have, positive or negative, and just what their chemotactic properties are for certain cell structure, we do not know.

Dr. Buckley brought out a point with reference to the action of certain agents on nucleinic substances. This point I attempted to bring out in my paper as regards the action of agents upon the microörganic cell instead of action on the higher cell forms. So far as we know, bacteria have no nuclenic substance. It has been claimed that there are nucleinic substances in bacteria. There is reason to believe that some time we shall find an agent which will act upon bacteria cell life instead of upon the higher forms, and when such is the case, we shall have reached the highest point possible for an antiseptic or disinfectant.

Dr. Reid asked:

What was the use of the word disinfectant? Why not use the word antiseptic?

As I understand it, an agent that will exercise an influence on the development of the microörganism would be a disinfectant; and those agents, as I have said, which inhibit growth in weaker solutions may be called antiseptics. The anthrax spores and other spore-bearing microörganisms live better under certain environments. There are two or three microörganisms that are constantly present in the mouth, spores of which will respond to the action of agents, and among them I may mention the anthrax spore. The latter will live more than forty days in a five per cent solution of carbolic acid. Suppose you have a putrescent pulp in which there is a virulent condition of the microörganisms; after three or four treatments with an antiseptic the conditions apparently are all right for filling the root canal. You fill the root canal, and for forty days there is a dormant condition, so to speak; there is no growth of the microörganisms, but after that period the trouble recurs the moment the conditions are favorable for the spores to go on and develop.

I do not believe it is possible to obtain any definite results in the treatment of teeth by such antiseptics and disinfectants as some dentists are in the habit of using. I do not believe the word antiseptics has practically any place in dental literature. An antiseptic may inhibit the growth of microörganisms for an indefinite period; but there are spores of germs that have been found healthy, after having been put in sealed tubes on silk threads for nine years. There was inhibition of the growth of microörganisms for that length of time, but the moment they were placed in proper environment they developed pathogenic properties.

Dr. Ames:

I understand that you would discard the word antiseptic instead of disinfectant?

Dr. Cook:

I would discard certain remedies as antiseptics in certain treatment.

Reference has been made to the resistance of the tissues to bacteria. It has been clearly demonstrated that almost immediately with the action of the microörganisms that there is developed a substance by the white blood corpuscles or leucocytes which inhibits the growth of the microörganisms, establishing immunity, as in diphtheria or smallpox, more especially. If a person has had the latter disease once, he is not susceptible to it for many years, probably not again, and it is due to the development in the body of the action of that infective agent, causing the development of a substance known as bacterial lysin, an agent that we cannot call anything else because it causes a gradual dissolution of the microörganic cell. Microörganisms will live for a definite period, but they become distorted in form, their morphology is changed, and eventually they cease to develop. Finally, the spores become granular and pass away in the solution that is obtained from certain blood serum preparations.

As to the question of Dr. Ames regarding the effect of these agents upon metallic substances or plates, I will say that some years ago a homeopathic gentleman presented a paper before this Society in regard to the action of mercury in amalgam fillings. I was put down to open the discussion on that paper. I prepared a number of experiments in regard to the action of metals to microörganisms. Just what effect such metallic substances have, I do not think anyone is prepared to make a definite statement. I could find no difference in the quantities I weighed, and I weighed a number of quantities of substances, as mercury, gold, silver, platinum, copper, etc., and placed them for an indefinite period, from fifteen to twenty days, in cultures of bouillon, in which I grew different forms of microörganisms, and found in taking them out and weighing them as accurately as I could, that the metals had not undergone any change whatsoever in this growth. I question whether or not that metal has any particular effect upon these forms of microörganisms, except in some cases, such as the bacillus of tetanus, which seems to have a greater affinity for rusty iron oxidation and consequently we get so many cases of lockjaw in horses and men from the introduction of a rusty piece of nail or iron of any description into the tissues. Infection follows frequently in such cases. Different microörganisms have different affinity or chemotactic properties for certain special substances.

In regard to the tooth powder mentioned by Dr. Arnold, it is very interesting. Dr. Miller, some years ago, found that by placing saccharine in certain agents, such as the benzol series, he had a better antiseptic than without saccharine. Saccharine has the ability to break up certain of this complex molecular structure of agents, and put them in a better solution for disassociation, in order that they may be better antiseptics. But as a tooth powder, you may put this roomful of them into your mouths, and they would not kill germs. I have experimented with all forms of tooth powder, and ordinarily, I may say, I would rather have a normal salt solution than any of them.

I have demonstrated the use and value of protargol in the treatment of pyorrhea. Its effectiveness in the treatment of pyorrhea and similar conditions has been clearly demonstrated to be very satisfactory. It is a remedy worthy of consideration.

Dr. MaWhinney mentioned the point that the agent discolors the teeth very badly if used to any extent, and that it is absolutely impossible to bleach it out. I find I get better results by using the preparation first in the pockets after removing the deposits, by employing lactate of copper in mild solution, following it up with protargol and you get much better beneficial effects than if you use it alone.

Dr. MaWhinney (closing the discussion):

With reference to the remarks of Dr. Brophy about silver salts, I have done quite a little experimenting with them, but the difficulty with all of them, except the last one mentioned, is to get them in the kind of solution that I can work with in the laboratory. It is almost impossible to get protargol in a solution that is practical in laboratory work, and I have not been able to do it. I got discouraged and wrote to the house about that and they said it was not intended for that kind of work; that it was intended for the treatment of gonorrheal conditions, and for such purposes it was very, very efficient.

I have experimented a little with argyrol, and I think a good deal of it. It also has the same objection when used in the roots of teeth, on account of its having a tendency to discolor the teeth.

So far as chinosol discoloring the roots of teeth, I think the discoloration would be minimized if dentists would use a platinum broach. Almost all of the discoloration is due to the rapid oxidizing of the steel. If you use a platinum or nickel broach you will not have any difficulty. I do not believe I have had to bleach a tooth in which I used chinosol for three or four years, and I use it every day.

I had something to say in my paper about the deodorant effect of chinosol. Chinosol is not a good deodorant. Chinosol is only recommended for getting rid of pus. As I stated in my paper, where you have necrotic tissue that has suppurated, that is a place where we want a more irritating germicide, one that will liberally cook or burn out the necrotic tissue. That is an important point to remember.

Regarding the remarks of Dr. Reid, that the essential oils have gone to the bad, I do not agree with him.

There is one thing that every experimenter with essential oils has noticed, and that is this: If you will take any microörganism that I have experimented with and expose it for a short time to the essential oils, it will grow better than the control. I mean just what I say. I have demonstrated it. Nearly all growth of cell tissue is accomplished through irritation. All stimulation of every kind to the organs of the body comes primarily from irritation. A slight irritation of cell tissue will bring about a ready response of cell growth, all things being favorable. That is as true in the microörganic world as elsewhere. It is for that purpose you want the essential oils in treating conditions where you have not necrotic tissue, but fairly healthy tissue that needs to be stimulated to grow. The essential oils are excellent for such places as that. They are stimulating to the growth of cell tissue.

Bear in mind, that the paper stated that the only conditions under which we need germicides in the practice of dentistry are in these old, long-standing, violent suppurations. Anywhere where you have a violent suppuration, where there is danger of destruction of much tissue from microörganic activity, there is where you want germicides. You do not need them under any other conditions about the teeth. You need them for sterilizing your hands, instruments, rooms, etc.

A disinfectant means an agent that will take from anything its power to infect. The derivation of the word means that. A germicide, on the other hand, is an agent that destroys germ life. When you come to analyze the two to a final analysis you will find that an agent which will take from any septic material its power to infect is a germicide. You must destroy the germ life of it.

Dr. Reid:

Why not confine yourself to the one word, germicide?

Dr. MaWhinney:

An antiseptic is an agent which stands against septic poisoning, in contradistinction to a germicide which destroys the life upon which the poison depends. An antiseptic prevents its development.

There is another list of disinfectants that needs studying. I refer to the iodine group. I am very fond of the iodine group. The silver salts, iodine salts, and a number of others I am interested in at the present time, and I think they are most excellent agents when we understand just where and how to use them.

In closing, I wish to thank the Society for its expressed interest in this subject.

NINETEENTH ANNUAL MEETING MINNESOTA STATE DENTAL ASSOCIATION, ST. PAUL, MINNESOTA, SEPTEMBER 1, 2, 3, 1902.

Discussion of Paper by Dr. W. T. Reeves, of Chicago, on "Some Principles Underlying the Manipulation of Porcelain Work."

Dr. J. E. Nyman (Chicago):

Dr. Reeves is one of those few men who triumph over difficulties, and who achieve success out of disappointment in their chosen line of work. He is a man who triumphs by his skill. The work he does depends very largely upon the skill of the individual.

There are a few beliefs he has with which I do not quite agree. Of course, I am probably wrong. One point is where he speaks of the success of the porcelain inlay and says it is due to the compatibility of porcelain with the tooth structure. I think porcelain is as foreign to the tooth structure as gold, and that the great secret of success of the porcelain inlay is due to the medium of cement. The gold inlay cemented bears about the same relation to tooth structure as the porcelain, and in many parts of the mouth where stress is brought to bear the gold inlay is preferable to the porcelain. I think the porcelain is more successful than the gold where the enamel is unsupported by the dentine, for the reason the tooth structure above the porcelain inlay is left in the best possible condition to resist the attack of caries. Still I do not believe we have come to the point of not using gold filling at all. I think as long as we have teeth and as long as we have dentists we will have cavities to be filled with gold and we will have some filled with porcelain. For instance, in defects of the occlusal surfaces of bicuspids and molars, I do not think we shall ever come to use the porcelain inlay. There is a great deal of controversy over high and low fusing bodies, and the fact has been demonstrated with many materials that a mixture of certain proportions will give the best results. Amalgams mixed in certain proportions yield certain results superior to other mixtures. We know an alloy of itself mixed with a certain amount of mercury gives a better result than if mixed in some other proportion. So we find that calcium, feldspar, silex and other materials if mixed in a certain proportion give a better result where fused at a temperature of 2,100 to 2,200 degrees. Therefore, I advocate high fusing bodies as a rule because the proportion of ingredients gives the best result if properly fused under a high temperature. The coloring of high fusing porcelains is nearer the color of the tooth than the color of the low fusing because they are not invariable.

I have frequently been asked whether I swedge the matrix in the cavity or burnish it. I use the swedging process in cavities and many others rely upon the burnishing process. It is a matter for you to determine as to whether you swedge or burnish.

Dr. Reeves' method that he advocated of putting in the colors in layers, of course, breaks up the rays of light and mixes them, but still I never saw a porcelain inlay look so well when set with cement as when set with saliva when I had it in the mouth. If we are able to obtain a better cement than the ones we are using, the problem of the porcelain inlay will be almost solved. Still it will be necessary to have the exact shade of the teeth. That is undoubtedly true of every material we use in the teeth. The light striking at different angles will give the teeth a different shade, and the teeth cannot be filled with any mixture that will invariably conform to the exact shade of the teeth. An artist painting a picture strives for effect. Ordinarily no close scrutiny is made of a picture by the observer, but he will look at a picture across the room and the pictures that give the best effect please the most, and the picture we thought looked the best across the room might turn out to be the poorest piece of work, and yet the picture that gives the best effect is the best picture, and the inlay that gives the best effect would be the most successful.

I am not quite as enthusiastic about the work as Dr. Reeves, so I do not attempt to apply the process in all cases. We are both working on theories at present and we have to wait to see what time will develop.

Dr. C. E. Bentley, Chicago:

This is a very interesting subject. I believe I am correct in saying that there is a tidal wave of porcelain sweeping over the profession, and like all tidal waves, it must have its rise and subsidence. I believe we are on the crest of the porcelain wave today. I want to be put down as an enthusiast of porcelain, and yet I want to be considered a conservative advocate. I want to make public acknowledgment on this floor, as I have done on other floors, to the skill and enthusiasm of Dr. Reeves as being responsible for what I have obtained in porcelain inlay work. And yet I want to say that I am not quite as enthusiastic as Dr. Reeves. A movement or an innovation of any kind must of necessity have its enthusiasts and its conservative representatives. Dr. Reeves, in my opinion, without any disposition to flatter, has perfected the system of laws underlying the porcelain inlay to a greater degree than any other man in the country. I have been a close follower of his and have seen his work from day to day, and I cannot agree with Dr. Nyman in some of the utterances made in his discussion. But the idea of compatibility is the utterance of one who is perhaps more enthusiastic than others. I do not think the use of the term compatibility is fully justified. We cannot compare a living structure with a foreign material as to compatibility, so I cannot agree with that portion of the argument. I further disagree with Dr. Reeves with reference to his argument in regard to immunity. I know this, so far as I have investigated the subject and so far as I have watched the disappearance of decay it is not so prevalent as with other fillings, but the statement that the debris of food does not gather upon the glassy surface will not stand scientific investigation. It is only on account of its position with reference to its self-cleansing process, so that you either have a greater or lesser quantity of these microörganic plaques on that surface.

I want to utter just one warning word. I understand that some of you in the Northwest have not become so enthusiastic over the porcelain inlay as some of the eastern profession. I want to say to you, do not be too enthusiastic over porcelain inlay work at present, for it may materially interfere with your professional happiness in the future. Of the work I have seen since I have been in attendance at this convention, what you have done with gold and amalgam fillings, I say you are proving your skill as dentists as well as any set of men it has been my pleasure to visit. I do not want to commend anything untried to the dental profession. I say untried, because we have not yet had sufficient time to test the durability of porcelain inlay filling, and it is this note of warning I give to you. In taking up this new departure I would avise you to still stick to some of the old friends that have carried you thus far. I do think that porcelain inlay work is the most exacting of all the departments of dentistry. A man may be thoroughly skilled in the manipulation of gold and yet may fail absolutely in the requisites that are necessary for doing perfect work in porcelain. There is no such thing as imperfect work in the inlay. It must be perfect or it is not worth anything. You may have an imperfect gold filling, you may have an imperfect alloy filling and there may be no harm done, but imperfect porcelain inlay work means failure, and it would mean a great deal to the reputation of the dentist.

Dr. Foote:

I agree fully with Dr. Reeves in regard to the color question. I think the dentine is the substance that gives the color to the tooth. We all know the enamel is of different thickness. I think it is the way the enamel runs and the direction of the reflection of the light which gives the tint to the teeth. In a tooth where the enamel is very yellow, and the prisms run direct to the eye, you will find very little variation if they run in the direction of the incisal edge. If you look at the middle third of the tooth along the incisal edge you will find a lighter tint on the incisal than on the gingival. You take a tooth where the dentine does not run nearer than the first third of the incisal edge and the two normal shades come together you will find a bluish tint, and that tint is caused by the reflection of the light from the interior of the mouth. Cut off the light and you will find the blueness disappears. That is caused by the reflection of the light. It is just like the formation of a rainbow; it will not appear unless the sun strikes the raindrops at the proper angle. It is simply the reflection of light on the little drops of water, striking them at a certain angle that causes the rainbow. It is the same with the prisms of the tooth. As I said before, the nearer you approach the incisal edge the greater the reflection and the more will that bluish tint appear from without.

Dr. W. T. Reeves, Chicago (closing):

There was something spoken by both Dr. Nyman and Dr. Bentley about compatibility. I think when you have a material which will restore lost tooth substance in place of the tooth in a perfectly normal condition as far as the sensation is concerned, and the appearance in the mouth of the patient is normal, I think we have proved the compatibility of the material to the tooth. We have no other material in our cabinet other than porcelain that will do that. You cannot get that condition with gold, because gold will not give you the normal condition of the tooth that the porcelain inlay does. Porcelain is acknowledged by all to be one of the best non-conductors of electricity known. I think that plays quite an important part in the question of compatibility.

We all have had patients with fillings that have caused them trouble. The irritation was not extensive enough to cause death of the pulp, but just enough so the patient was conscious of it and was always telling you that his tooth bothered him every once in a while. A little hot coffee, a little ice cream or something like that would always cause some irritation. That might continue for years and not cause trouble to the pulp, but you take those gold fillings out and put in porcelain and in fifteen minutes that tooth is just as perfect as before there was any decay. I think that means that the material of the lost tooth structure has been replaced with something that is compatible with the tooth. There are a good many facts in connection with inlay work that at present may not be quite scientific, but I think science must come around to harmonize with these facts instead of these facts harmonizing with science. (Laughter.)

Conservatism was spoken of by Dr. Bentley, but I think Dr. Bentley can tell you, if he will, that there is not a more conservative man in Chicago than I am. (Dr. Bentley: Not on that subject.) (Laughter.) I have not arrived at the point of doing an almost exclusive work in porcelain inlays except by a very slow, conservative stage, and I think I may state that I have not put in to exceed ten gold fillings in a year.

I am now using porcelain in anterior and posterior teeth, and have not been putting in fillings to any great extent since 1893. It is a wonder to me that they stay, but they do stay. I do not think any of you doubt that if a good filling has been dislodged and has been set back by the medium of cement it will do better service than under the original condition. It was cases of that kind occurring early in my practice that gave me the most confidence in the retentive power of inlays.

In regard to immunity, while I cannot say as to scientific investigation, yet I do not believe that microörganic plaques stick to the glassy surface. In the mouths of young persons the cement fillings seem to last and the gold fillings will fail in a year. I have replaced very many such with inlays; I have put in as high as thirty or forty inlays. I had a certain patient two years ago who had lost ten to fifteen fillings, and in the two years since the inlays were put in that mouth there has not been a thing to do. I think these porcelain inlays have brought immunity to many mouths. A glazed surface does not retain food deposits and does not induce caries, as is the case with fillings.

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EDITOR: C. N. JOHNSON, L. D. S., D. D. S.

NEW YORK LETTER.

NEW YORK, April 1, 1903.

Dear Mr. Editor:

There was the usual monthly meeting of the New York Institute of Stomatology held at the Chelsea on March 3.

The paper for the evening was to have been by Dr. G. V. Black, but owing to his illness it was necessary to make a change a few days before the date of the meeting. Dr. E. A. Bogue was prepared to give a paper entitled "Some of the Causes of Irregular Teeth." This was illustrated with the stereopticon, models and drawings. The pictures thrown upon the screen were remarkably clear and well defined.

Dr. Bogue laid especial stress upon the advantages which would accrue if proper attention was paid to the occlusion of the first permanent molars soon after eruption; by noting this, and if they are not right, assisting them to a proper position he claimed much of the regulating which now is necessary would be obviated. His idea seems to be that if the molars occlude properly the other teeth as they develop will occupy their proper places, or nearly so. "If they occlude too far forward or back, or lingually or buccaly, irregularity is absolutely certain."

Dr. Bogue asked the question: "What difference is there between a dislocated femur and a dislocated molar?" and answered it immediately, thus: "One limps through life, the other limps through mastication."

He said that it is only recently that we have come to regard the first permanent molar as the most important tooth in the dental arch.

A drawing of a skull (profile aspect) was shown on the screen during the course of his remarks, done by John Hunter in 1774, which showed beautifully occluded teeth and dental parieties.

Dr. Davenport, in his discussion of the paper, linked the names of Drs. Angle, Baker and Bogue in speaking of their remarkable work. Dr. Stanley, who at one time was associated with Dr. Angle and who professes regulating as his specialty, said the first permanent molars are the keynote, the other teeth the symptoms. Dr. Taylor, of Boston, believes that the mixing of races has much to do with the problem of irregularities. He referred to two characters of cases we sometimes meet, in which he recommended the chewing of gum for correction. One is where the molar teeth alone occlude, the incisors and cuspids not meeting, the other is those cases in which the anterior teeth alone occlude, the molars (occlusal surfaces) standing apart.

Dr. Bogue also showed a new type of band with pipe attachment for holding the expansion arch while regulating. It does away with the lingual nut as in the Angle appliance, which is a wonderfully good thing. Patients complain about that more than any one thing in regulating. It requires some days to get used to that part of the appliance.

President Dr. Charles Bu Bois opened the meeting of the First District Dental Society on March 10, at the Academy of Medicine, and after some preliminary business, introduced the essayist of the evening, Dr. R. M. Sanger, of East Orange, N. J., who read a paper on "Half Collar Crowns." He said that they were best adapted to the six anterior teeth and have a limited use on bicuspids. The reason for this is that the collar fitting the lingual half only of the root and the pressure being outward always, the collar does service only where it is required.

Where a deep collar is needed or in cases of fractured root where a collar might be applied, the scalpel is used to facilitate the passing of the gold high enough for proper retention. Tri-chlor-acetic acid is used to stop hemorrhage. Soft gold or platinum is then grasped in half-round pliers, allowing about one-fourth of an inch to project beyond end of pliers. The metal is bent about the round part of pliers and flattened on the end part, which corresponds to the end of root. With a pair of scissors the overlapping ears (sides only) are cut off, the metal fitted to root and burnished properly. A pin is pushed through the metal cap into root canal, the whole removed carefully and soldered together. When replaced a porcelain facing, after being backed with 32 gauge plate, is adjusted to same, waxed together, invested and soldered, the solder fills all the space between the facing and floor of the half collar. Of course porcelain can be used instead of gold if required.

The making of a perfect fitting post for enlarged or tapering roots was also described. A dowel pin was adjusted into root canal, then thin platinum ribbon was caught with solder at apex, then wound spirally about dowel and replaced in root. After proper shape had been attained the whole was withdrawn and solder flowed in to fill up space between dowel and platinum pin.

A cordial invitation was extended to the Odontological Society members and a number of guests to attend the meeting on Tuesday, March 17, at its usual meeting place, the Academy of Medicine.

During the incidents of office practice Dr. Goldsmith asked for information. What should be done for an adult, who still retained a temporary cuspid, the pulp in which was almost exposed? He said he had filled the cavity with oxyphosphate, but some soreness remained. Dr. Jarvie said that gutta-percha would have been better. If the permanent cuspid was near or could be determined by X-ray, he thought extraction wise, then to bur process away and he would expect the tooth to eventually erupt, although it may take a year or more to do so. Dr. W. W. Walker brought models of a case where, to open the bite, capping all the teeth had been resorted to, but due to irritation of the gingivae the crowns were removed, the irritation has continued and is so severe that the gentleman finds it positively painful to masticate, so lives on soft food, which is playing havoc with his general physique. Dr. Walker also asked for information. Dr. Brackett thought the replacement of proper crowns, probably not touching the gums, the best plan, or try the wearing of aluminum splints while masticating to prevent the food from passing into interproximal spaces.

Dr. C. A. Brackett, of Newport, R. I., was then introduced as the essayist of the evening. He had been scheduled to "read a paper," but he said that he had "come to talk to and with you because someone told me some time ago that my written papers were worse than my talks." Those who were present that eve are certain that he knows how to talk entertainingly and connectedly anyway, and that is a great gift.

Dr. Brackett showed himself to be quite a learned man and a scholar. He said, "My heart brought me here and not my head. My affection for this old society, which did me the honor to make me an honorary member more than a quarter century ago." The title of his remarks was, "Some Things Which We Need." He said he was reminded of the old conundrum, "What is the largest room in the world? Room for improvement."

Dr. Brackett reviewed dentistry somewhat; its past, present and future. "Has dentistry made great strides? Yes; if it had not it would not have kept up with the procession." The history of dentistry is a brilliant one. It has built up a literature in half a century, both periodical and text-book.

One of our greatest credits is anæsthesia. But we have learned a great deal from the practice of the healing art, too. "Things not made better designedly grow worse spontaneously."—Bacon.

One of the great needs is a different filling material. The present system is too inadequate and particularly too expensive, for all classes cannot avail themselves and much suffering results.

Hygienic and dietetic problems need something. 'Tis the disposition of humanity to do a good deal of grumbling. Dentists particularly. They are never content. All do it unthinking. Things don't go right. There will always be problems difficult of solution. Do the best you can. The philosopher is liable to win out. "One of my professors said during my student days: 'When you have something especially to do, just make it easy, by careful study, by ingenuity, etc.' Do a thing; don't do at it. Another thing we need is means of retaining medicine in the cavity of a tooth temporarily. One easily applied and easily removed; one that will be certain to accomplish what we desire of it."

Dr. Brackett ventured to suggest that adrenalin chloride was one of the great things that has come to us. It possesses all the virtues claimed for it, and there is nothing objectionable to it. "Don't be afraid to do unorthodox things. Apply most anything to meet the needs."

What we need most is wisdom and discretion to choose from all things and leave out those things undesirable. "There should be a means of sustaining men in their individual work, such men as Kirk, Black, Williams and Miller."

Another great need is the education of the public in reference to their own needs, to the requirements of their teeth, as to what dentistry is and can accomplish. The condition of ignorance and depravity which exists throughout our country is deplorable.

"Gratuitous service, a practical problem, is before us now. Something where more than extraction will be accomplished. Endowments will probably solve that. We need legislation to proceed against illegal practice, but get good legislation first. A further need is not only good dentists, but good citizens also, for we are often called into service aside from dentistry, and it will make more of esteem in which the profession is held."

Dr. Jarvie, of Brooklyn, made a few remarks in eulogy of Dr. Brackett's brilliant talk only a synopsis of which I have given you, for one became so interested as a listener that much escaped. Dr. Jarvie said that Dr. Brackett had gone over a great deal of ground. He felt that the future of dentistry would be the prevention of decay.

Dr. Perry said that the talk was a genuine New England output, just full of good, sound common sense, as refreshing as the winds that blow over those states. Invigorating, optimistic, full of hopefulness. A splendid address. Dr. Brackett has the rare quality of saying things as they are without regard to isms, etc.

There was a dental manufacturers' exhibit in Philadelphia the 17th, 18th and 19th of March, which was remarkable for the number of smaller concerns exhibiting and for the fewness of the larger ones. Withal it was well gotten up and well attended for the first thing of its kind. It probably was a success so far as it went. They certainly strove hard for a good attendance and they got it, for the place (Horticultural Hall) was quite crowded; too crowded for comfort. The goods were well displayed and the manufacturers' representatives did their parts well.

The passageways between exhibits were too narrow. One end of each aisle was closed, so that one had to go up one aisle and down the next, and so on until he reached the only entrance and exit to the place. In case of an accident in the hall or indisposition of a visitor it would be quite a problem for immediate relief. The weather was very mild. The place was stifling, because with all the crowd not a window would be opened.

The clinics were the same old game. First come, last to leave, so that very few got even a sight of the clinician.

We have to note the death of Dr. Charles A. Woodward, which occurred on the 7th of March. Dr. Woodward was one of the older practitioners of New York and was well known and beloved. Dr. Woodward was one of the early members, if not a charter member, of the Odontological Society, and for years one of the most prominent workers in that body. He was also one of the charter members of the Institute of Stomatology and became its vice-president. At one time he occupied the chair of Prosthetic Dentistry at the New York College of Dentistry. He was a native of the state of Maine.

Brooklyn, too, has lost one of its representative men. Dr. W. A. Campbell died early in the month. He was a man of sterling quality and character, esteemed by his patients and fellow practitioners, a whole-souled, genial fellow. He was in his sixties. Grippe, developing into pneumonia and kindred ills, has caused trouble to a great many dentists of this vicinity this year.

The intelligence comes this day of the death on the 30th of that veteran, Dr. S. B. Palmer, of Syracuse, after an illness of three weeks following his retirement from active practice. The body will lie in state in the First Presbyterian church in his town for some hours. The last honors paid Dr. Palmer by his professional brethren were at the New York Athletic Club, upon the occasion of his eightieth birthday anniversary. Dr. Mills remarked then that Dr. Palmer was growing old cheerfully, but although in the natural course of events dissolution is inevitable, yet Dr. Palmer seemed to possess the same mild vigor characteristic of him. Your readers will remember that a synopsis of the proceedings at that dinner was given in the November letter to THE REVIEW.

At the regular monthly meeting of the Second District Society (in Brooklyn), in March, Dr. D. W. Barker was one of the essayists. He succeeded in provoking a lively discussion by his opposition to the theories advanced by Dr. Ottolengui regarding the propriety of filling children's teeth with gold. Dr. Barker sustained his contentions very well.

Following close upon your large meeting in Chicago, the Odontological Society of Western Pennsylvania held a good two days' meeting at Pittsburg on March 10 and 11. Among the essayists we noted Dr. G. V. I. Brown, of Milwaukee; Dr. E. C. Talbot, of Chicago; Dr. J. G. Palmer, of New York; Dr. L. Ashley Faught, of Philadelphia; Dr. E. C. Kirk, of Philadelphia, and Dr. C. H. Land, of Detroit.

Tuesday, the 10th, was a very rainy, disagreeable day, but the attendance was large and the essayists well received. Dr. J. A. Libby, late President of the National, is one of the earnest workers and mainstays of this society. There was a large number of exhibits and the clinics were remarkably good. Pittsburg has within its borders some very fine "workmen in pure gold," and it was a pleasure

THE USE OF CORRECT TERMS.

In a very excellent paper by Dr. W. C. Gowan, in the April number of *The Dominion Dental Journal,* on "Words improperly used by dentists considered from an ethical point of view," will be found a vigorous handling of some of the pet phrases of dentists. The profession today are growing more careful than formerly in regard to nomenclature, and yet we too frequently find serious lapses in this respect. Some of the terms criticised by Dr. Gowan are "price," "opposition," "customer," "business," "guarantee," "bargain," "job," "trade," "kill the nerve," "cap the tooth," "cure a gumboil," "ulcerated tooth," "dead tooth," "rotten tooth," "hollow tooth," "pull," "draw," "false set," "stump," "fang," "snag," "Doc," "silver filling," etc.

Every progressive dentist, and particularly every young dentist, should read this paper. There is too great a laxity on the part of speakers and writers in the profession in regard to the use of correct terms, and when it comes to casual conversation between members of the profession, or between them and their patients, the slaughter of words is sometimes terrific. If dentistry is to be looked upon as a learned and dignified calling its representatives must have a greater regard for purity of diction, and above all else they must reject from their vocabulary those phrases which smack only of trade and barter. Many of the terms in common use by dentists are radically wrong in meaning, while others are entirely misplaced, or are without meaning or application.

Let the profession give some thought to this matter, to the end that improper and ill-advised phraseology be eliminated not only from our literature but from our common conversation.

THE EDITOR'S DESK.

I have had many letters of late asking if the Editor's Desk department has been abandoned. It has not. It is only a case of other and better matter crowding it out in the last few issues. Our pages have run far beyond the allotted number in every issue, and there has been no room. When we get the high pressure slightly relieved we will open the Desk again and shake hands familiarly with our readers.

PRACTICAL HINTS DEPARTMENT.

Edited by G. W. Johnson, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, The Dental Review, 55 State Street, Chicago, Ill.]

How to Observe the Baking Point of Porcelain.— By throwing the light of a mirror into the furnace the flow of porcelain can readily be detected. C. J. Lange, Milwaukee, Wis.

◆

Syringe Point.—In washing out a diseased antrum or an abscess, use a hard rubber point on the syringe, in preference to a metal point, and the patient will be free from the disagreeable shock caused by the metal point coming in contact with the soft inflamed tissues.

R. E. Collins, Chicago.

◆

Relieving Pain After Extraction.—In cases of unavoidable or advisable extraction of a tooth or root if the after-pains caused by the extracting are severe, relief may be given in a short time by thrusting a pellet of absorbent cotton dipped into chloroform, well into each root socket and leaving it there for a minute or two, and then remove it. A separate pellet of cotton thus medicated should be inserted into each root socket involved. In extreme cases this may be repeated and relief is sure to result. H. A. Cross, Chicago.

◆

Cement Slab.—The ideal slab on which to mix cement is a glazed tile. The ornamental tiles used around fireplace mantels are the best, and may be procured in convenient sizes, from any dealer in builders' supplies, for a few cents. They are perfect to mix cement on, and can easily be made *absolutely clean.* Scraping to remove cement does not scratch them, and thus afford lodging places for hardened cement, as it will with a glass slab, and make it impossible to have an "absolutely clean" surface.

H. B. Denton, Eveleth, Minn.

Preparing Root Canals for Filling. — The root canals are cleansed and dried in the usual way. Before filling with chloro-percha and gutta-percha points, tinc. aconite is pumped into the canals by means of a broach wrapped with cotton, after which the surplus aconite is removed from the pulp chamber with a pellet of cotton. The canals can now be filled with chloro-percha and gutta-percha cones in the ordinary way and no soreness will result. The action of the tinc. aconite on the tissue in the apical region prevents inflammation. I have not had an instance of patients complaining of soreness of the tooth since I adopted this method.

J. W. Daniels, Monon, Ind.

◆

An Ideal Amalgam Filling. — Adjust the rubber dam to the tooth which is to be operated upon. Open into the cavity and remove all decay, care being taken not to cut away any more enamel than is necessary to allow proper access and to prevent the recurrence of decay. Prepare the margins in a symmetrical form and polish as smooth as possible. Sterilize the cavity with a good germicide and dry well with hot air. Cleanse with chloroform to remove any oily or foreign substance and again dry with hot air. The cavity is now ready to be filled. Line with cement to the inside margin of the enamel and place a coating of amalgam over it before the cement has set. When the cement has become sufficiently hard proceed with the completion of the filling, using the amalgam with as little mercury as possible and malleting well. By this method we have a perfectly sealed cavity where decay will not recur. The dentine is protected from thermal changes and the walls will not turn dark. We also have better retention and a stronger tooth.

E. R. Batty, Alma, Neb.

MEMORANDA.

THE COLORADO STATE BOARD OF DENTAL EXAMINERS

will meet at Denver, June 2d, 1903. All applications for examinations must be filed with the Secretary before that date. M. S. Fraser, Secretary.

MICHIGAN DENTAL ASSOCIATION.

The forty-seventh annual meeting of the Michigan Dental Association will be held in Petoskey, Mich., July 7, 8, 9, 1903. All dentists are cordially invited. Frank H. Essig, Secy.

PENNSYLVANIA STATE BOARD OF DENTAL EXAMINERS.

The Board of Dental Examiners of Pennsylvania will conduct examinations, simultaneously in Philadelphia and Pittsburg, June 9-12, 1903. Address the Dental Council, Harrisburg, Pa., for application papers and further particulars.

G. W. Klump, Secy.
Williamsport, Pa.

THE SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

will hold a meeting at Redfield, S. D., June 2 and 3. No candidates for examination will be received at this meeting after 9 a. m. on the 2nd. The South Dakota State Dental Society meeting will be held at the same place June 3, 4 and 5. All candidates taking these examinations should come prepared to insert gold, amalgam and cement fillings.

G. W. Collins.

SOUTH DAKOTA DENTAL SOCIETY.

The annual meeting of the South Dakota Dental Society will be held at Redfield, S. D., June 3, 4, 5. Meeting begins 10 a. m., June 3. A fine program is assured. All reputable dentists of this and other states cordially invited. The State Board of Dental Examiners will be in session at the same time and place.

D. St. I. Davies, President, Woonsocket, S. D.
W. W. Price, Secretary, Centerville, S. D.

THE CHICAGO DENTAL SOCIETY.

The following officers of the Chicago Dental Society for 1903-1904 were elected at the annual meeting, Tuesday evening, April 7, in Schiller Hall:

Pres., D. M. Gallie; First Vice-Pres., W. H. Taggart; Second Vice-Pres., G. W. Dittmar; Rec. Secy., Winthrop Girling; Cor. Secy., A. E. Morey; Treas., C. P. Pruyn; Librarian, J. H. Woolley. The Board of Directors and also the Board of Censors were re-elected.

A. E. Morey, Cor. Secy.

NATIONAL DENTAL ASSOCIATION.

Meets in Asheville, N. C., Tuesday, July 28.

Preparations are being made for one of the best meetings in the history of the association. The Section officers are preparing a program which, from a scientific and practical standpoint, will be difficult to excel. The clinics will be made a special feature. All dentists interested in the advancement of the profession should attend this meeting. All state and local societies should elect delegates who will be sure to attend the National meeting, they being entitled to one delegate for every six of their members. The usual railroad rates will be had on all roads in the United States and part of Canada—one fare and a third, on the certificate plan.

L. G. Noel, President.
A. H. Peck, Rec. Secy.

MAINE DENTAL SOCIETY.

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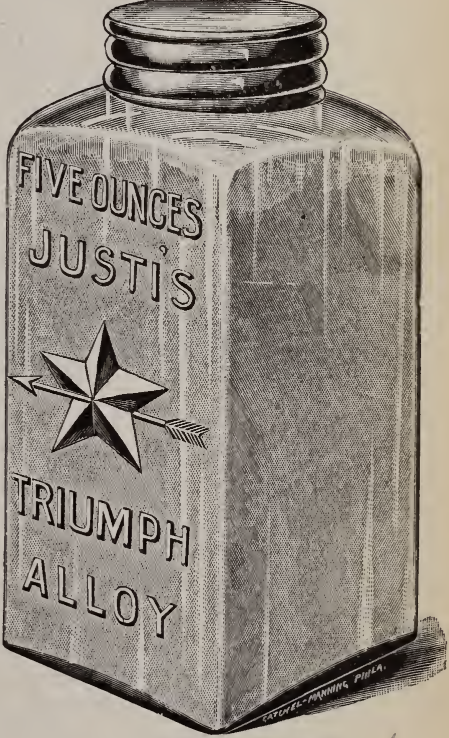

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DENTAL REVIEW.

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ORIGINAL COMMUNICATIONS.

UNIVERSITY TRAINING AND DENTAL EDUCATION.*

By Harry P. Carlton, D. D. S., San Francisco, Cal.

Mr. President and Members of the Odontographic Society of Chicago and your guests:—

Before commencing this paper, I wish to take this public opportunity of expressing my appreciation for the honor shown me by your Program Committee, in inviting me to appear before you to-day and read on the caption above given. I take it as *more* than personal, it is a compliment to the Institution I have the honor to represent, the Dental Department of the University of California.

After accepting your Committee's invitation to present a paper on "Some Phases of Dental Eeducation," little time was spent in selecting my title,—I chose the one in which I am most vitally interested.

I shall make no apology for asking your attention to a further consideration of a subject already much and often discussed in our Faculty Rooms, in our Society Meetings and among the profession at large. I wish in my paper to present this aspect of the general theme—the education of our Dental Student should be more thorough and extensive than it has been, or is, and particularly the preliminary training, heretofore sadly deficient, should begin earlier and be more substantial.

My enthusiasm in this branch of the service is born of an honest desire to see our profession placed on the high plane it justly deserves, and it lies with us. To this end will I ever give of my best endeavor, as I have opportunity, according to the measure of my ability, and I feel that I have the hearty co-operation of the thinking, progressive, intelligent body of student practitioners that constitute the profession of to-day. I realize how difficult and dangerous it is to dogmatically proclaim what I would do "if I were King," but we all like to play at being King, if but for a day, and this is what I think I should like to do,—what I trust the future will bring forth, and that ere long. It is a desire resulting from a constant association and personal contact with dental students for the past twelve or fifteen years—again from a mingling with large bodies of professional men, of our own calling and others, in many cities and states, from an observance of the effects of environment upon both brain and body (even in the three short-term courses in Dental College), upon more than fifty per cent of the crude material presented to us as students. From all this comes my purpose in presenting this paper.

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*Read before the Fifteenth anniversary celebration of the Odontographic Society of Chicago, February, 1903.

I have grouped my material about two main points:

First, the *Demands of the Day;* and Second, the *Way to meet these Demands.*

There is nothing upon which men and nations of the present day so pride themselves as their progress:—ancient history reveals the fact that this was equally true in the days of the dim old past. The Egyptians, the Greeks, the Romans, each prided themselves on their progress, and all seem to have had good grounds for their boast. And so on down through all the ages till we come with Titanic strides to our own wonderful Nineteenth Century, with its marvels of progress and achievement, which makes all past history sink into insignificance.

The heritage of the Twentieth Century from the Nineteenth is certainly wonderful to contemplate. "The ox and the horse give way to the locomotive, bicycle and automobile; the goose-quill to the fountain pen and typewriter; the sickle to the mowing machine and harvester; the printing press to the wonderful cylinder press and linotype; staircase to elevator; one-story adobe and log dwellings to thirty-storied skyscrapers. One hundred years ago two dozen members of the solar system were known and a million stars only; now five hundred members of the solar system and one hundred million stars."

We who have entered upon the threshold of the twentieth century are already seeing such wonderful changes, even since its early dawn, that we can almost conceive that before its close there will be little left to be desired among men when the twenty-first shall have arrived.

Take it as regards science:—It is safe to say that science has learned more in the past few years than she has learned in many decades previous. For the first time in all history, man has been introduced directly into the secrets of creation, for it is hinted that Dr. Loeb and some of his associates and others, have solved the origin of life, and this since the century commenced.

We have analyzed matter as it never has been analyzed before—for many years it was supposed that hydrogen was the lightest substance known to man. But in the last two years we have analyzed hydrogen to the thousandth part, and now have an atom that weighs the one-thousandth part of the smallest atom known when the century began. And within the last year another dream has been realized, and when the nitrate beds of the world have been exhausted, man will be able to draw from the atmosphere his supply of nitrogen; indeed it is now being commercially produced. At Niagara Falls power is being harnessed and utilized with something like one-quarter of the former expense of production, so that it would seem as if the products of the entire earth are to be increased from two to four fold in the next decade. Long distance transmission of power is an achievement of which we as yet know not the full value; and liquid air with its vast possibilities; the new science of photo-therapy—the uses of light in medicine; and wireless telegraphy—for the first time man is able to speak to man through the air and across the oceans. This country has witnessed the perfection of the submarine boat, so that it is being adopted by the great nations of the world;—and not only under water, but what man would never have dreamed until a century ago, traveling through the air; all this and more within these opening years of the twentieth century.

Professor James Bradley Thayer of Harvard has these strong words: "Time has gone by when it is necessary to vindicate the utility of deep and lifelong investigations into the nature of light, electricity and the mode of its operations; into the nature of light, and heat and sound and the law governing their action; into the minute niceties of the chemical and physiological laboratories; the speculations and experiments of geology; or the absorbing calculations of the mathematician or astronomer. Men do not now need to be told what it is that has given them the steam engine, the telegraph, the telescope, the telephone, the electric railway and electric light, the lucifer match, antiseptic surgery, prophylactics against smallpox and diphtheria—the new metals and the triumphs of modern engineering. These things are mainly the outcome of what seemed so few years ago to the majority of mankind useless and unpractical study and experiments."

As a profession, will we be prepared to take our place in the procession? In the matter of gaining knowledge we have not even been (as Newton has said), "like children picking up pebbles on the beach, while the great ocean of knowledge stretches out beyond us." We are coming to the point where we must know the science of things, rather than that which is merely on the surface. Right in line with this spirit of progress must march the most modern of the professions—our profession of denistry. Progress says to us, "Cast in your lot with me and prosper, resist me and be crushed." Many of you here to-day have seen the gigantic strides she has already made. Even in my limited career I have witnessed the rapid advance along lines of dental education. The dental college curriculum of yesterday is not that of today, nor will that of today be the standard of tomorrow. Much of the study and experiment resulting in these recent discoveries was done in the laboratories of the colleges and universities: for nowhere was progress during the nineteenth century more apparent than in education. At the beginning of the century the traditional classical curriculum was practically the only one recognized; but more and more, as the century advanced, the claims of scientific men were recognized, till now no university is considered complete without thoroughly equipped scientific colleges, and thoroughly endowed schools of technology are found throughout the country.

In consequence the world is today making great demands upon each member of society. This is proved by the effort that thinking men are putting forth in every department of research, to increase the sum of the world's knowledge of the laws of nature, of man's relation to his surroundings, of language, the arts, and of the history of the past. This is indicated also by the enormous gifts that rich men are making to establish these seats of learning, and to found new schools equipped with libraries and laboratories adapted to meet the requirements of investigators in every department of science.

Again it is proved by the eagerness of the people to acquire knowledge, and by the lavish bestowal of honors and emoluments upon those whose efforts have been crowned with success. The world says to the man, What do you know more than other men, and what can you do better? Have you investigated? What ills of humanity can you ameliorate or conquer, that will give men a larger and better world to live in? Go, bring forth something to delight the eye, or to ravish the ear; make two blades of grass grow where only one grew before; make darkness give way to light; govern invisible messengers in long flights across the seas, and make them tell their stories to listening ears. Can you do any of these? For those who answer to her satisfaction, here are honors, here is wealth, and the gratitude of millions of your fellow men. Never before in all the life of man has there been displayed such activity, such earnestness, such efficiency.

The demands of the day are indicated still further by the multiplication of technical schools and colleges all over our country, giving careful and systematic training in what have been regarded as the humbler trades, cultivating and ennobling them to the status of professions and conferring upon them a scientific degree. Today the machinist, the miner, the farmer and the dairyman spend three or four years in a school of technology or in one of the colleges of a university, the requirements for entrance to which presupposes a full high school course of study, embracing the ancient and modern languages, advanced mathematics, theoretical and applied, physics in its various branches, chemistry and other sciences. Today the boy enters a school where he is taught to forge iron, to use the file and the saw and the plane. If he intends to till the ground he learns the chemistry of soils, the nature of fertilizers, the qualities and values of fruits, vegetables and grains. He is taught the physiology of the domestic animals, and to make butter and cheese scientifically; —more than all this, he is trained to study, to think, to experiment, to originate. If we, the profession of dentistry, expect our graduates to be on a par with these young men, to occupy honored stations in cultivated communities, to command the respect of intelligent people, we must parallel their standards.

The demands were less in former years, when the village barber was the surgeon, when the country doctor or the village blacksmith twisted out the aching molar with his old turn-key. Their civilization was that of the border, for they were engaged in overcoming the savages of a continent. In those days the so-called self-made man, the man of all around attainments, was the valuable man, the valuable citizen. He could build a good chimney, prescribe a dose of blue mass or castor oil—in an emergency serve as an accoucheur, and on Sunday preach a fairly good sermon. Today demand is measured by the station of the individual;—of the man who calls himself "Doctor" more is required than of him who is styled carpenter, blacksmith or watchmaker. Mere mechanical dexterity is not enough to warrant a claim to any higher rank than that of skillful workman. The world, it is true, concedes titles to fakirs and mountebanks of all kinds—dime museums have their "professors" who swallow swords, long-haired "Doctors" who shoot at glass balls, "Colonels" who break bronchos. But the world displays no such complaisance towards the man who makes a pretense of superior knowledge in the realms of science and art.

We live in an age of science; when appreciation and honor and wealth await the greatly deserving, but where men's credentials are scrutinized, and their claims held in abeyance by the intelligent. In all professions the cry is for progress; for more light and larger-minded men; the age bristles with interrogation points, and new sciences are constantly bringing fresh surprises to our knowledge, necessitating a constant revision and re-adjustment of our views. Browning says:

> "Man, therefore, thus conditioned, must expect
> He could not, what he now knows, know at first,
> What he considers he knows today,
> Come but tomorrow, he will find misknown."

We are not asking too much of the coming generation; a comparison with the recent past justifies high expectations for the future, and we should be encouraged by the progress already attained as encouragement to further progress—but in spite of the tremendous strides of the past we are now face to face with this problem—do we want to be adjudged a merely high-class mechanical vocation, or a broad-minded, intellectual, scientific profession?

Dr. Kirk (in the January *Cosmos*) dates the birth of Dentistry from the founding of the first College, the first Society and the first Journal, in 1839 and 1840, and says: "Like all other professions, Dentistry began as an art, characterized by a superior handicraft in the doing of operations, mostly of a restorative nature in repairing the ravages of disease upon the human teeth;" an humble birth and beginning, and not much thought of in those days. But we quickly shook aside the swaddling clothes and made phenomenal and vigorous growth; all honor to those pioneers of dental art and early dental education. To continue again in Dr. Kirk's language, "The development of the art has been so thorough, that though we may not safely say that future progress is impossible, yet the multitude of methods and devices at our command would seem sufficient in number and adequate in kind, to meet all exigencies of practice for years to come." We may add a wheel or two here and there, simply improve in slight degree the mechanism, but it certainly seems as if the machinery and the tools are nearly perfect. He also refers to the demand now being vigorously made from many quarters, that dentistry be classed as an "independent" profession and given equal status in the specialties of the healing arts.

I quite agree with him that much, aye very much, remains to be done before that recognition, as such, can be accorded. If we would have the respect and regard of the other professions we must first respect ourselves. Dentistry should be a full profession and recognized as such, but it only will be when the character of the men who comprise it bring its recognition up to what it should be. The conferring of the dignified degree of Doctor upon men of deficient culture is wrong, and for this reason we fail of recognition not only abroad, but at home. "Doctor" is but an empty title as now used, while it should stand for learning and culture. I have heard with much distress our degree of Doctor of Dental Surgery referred to as "a gaudy jacket, which in many instances is but a cloak for ignorance, a bauble to be laughed at by the world of learning and a source of mortification to many a wearer."

I have said that any increase in dignity and professional status must come from within the great body of the profession itself. To gain these ideals and make the profession what it should be, a high grade of young men must be attracted to its ranks. As soon as the best men are attracted, excellent work will really be done and the development will then be a natural one. The community, as well as the student and the profession, will begin to understand the great meaning and worth of productive scholarship, and its great superiority to mere receptive and distributing scholarship.

In considering this my second point, the way to meet these demands, there should be no necessity for pleading the value of a higher education, the value of more thorough preparation for the duties of life. The man who doubts this is beyond the reach of argument. An uneducated man looks out on life through narrow windows and thinks the world is small. The educated man learns to face great problems seriously and to work patiently for their solution. The men who made our country were its educated men—not its college graduates alone—but men of high ideals and broad mental training, to give which is the end of higher education.

Certain persons of power and position in the financial and industrial world have questioned the value of a higher education. They say too much time and effort is expended to no avail in acquiring a university education, which could be put to better advantage by devotion to courses of study devised to equip one for the practical pursuits of life. Conceding however, that the higher or university education can be dispensed with by one who intends to become an artisan or man of practical affairs, I hold that when we come to consider the relations of the professions to the demands of the modern world, the university education is imperative and should precede entrance to professional life. Defining education from the point of view of preparation, it is simply a process of developing the human mind along lines of correct thinking—it is a means to an end. It is not what you put into a man, but what you can get *out* of him, that is a test of his education. Education comes through applied, systematic methods of mental training, and when properly fostered, results in a mind that can create. The statement is sometimes made that "Education is something larger than any particular method employed to acquire it, that institutional methods are not essential, and that the question of education after all, is purely personal and lies with the individual, with whom it is optional, whether he shall seek it in the university or elsewhere. Assuming that the individual can and will secure an education equivalent to that which the university affords, that is true, but experience teaches us, however, that unless acquired in the universities or colleges, it is not apt to be acquired at all. There are of course illustrious examples of self-educated men in almost all the various fields of human endeavor—Benjamin Franklin, Horace Greeley and Abraham Lincoln, for instance, and others; but the Lord didn't make Franklins or Greeleys or Lincolns, when he made the most of us. They are the exceptions, and I will make the assertion that without a university training, the average man is not a well educated man. But why teach our boys Latin and Greek, Euclid and Calculus? Engineers cannot be developed on figures alone—nor scientific dental surgeons on cavity preparation.

An old farmer was once asked by his neighbor why he sent his son to college if he expected him to come back to the farm. "Wall," he said, leaning on his plow, and casting his eye along the last furrow, "jest so he could plow a leetle closer to that stump yonder."

The professional man should possess the resources of a highly developed reasoning faculty, which comes only after years of systematic pursuit of what may be called higher or university studies. This broad mental training will make better dentists and better men, for it means that knowledge of things which enables a man to meet men; it means an assurance of life, a breadth of horizon, a seeing above the chimney tops, beyond the drudgery of detail to the big things; it gives that confidence which makes a man feel equal to any emergency; it gives humility at the thought of the many things he does not know; it makes him marvel at the wonders of nature and gives him a determination to do the best he can in the position where the Almighty has placed him, never helpless, always self-reliant; it makes of him a broad-minded man, who need not seek other company to give himself thoughts, who is always good company for himself, and therefore is better company for others. The difference between the educated and uneducated man is marked in a great degree by the confines of their vocabularies. Every added word conveys an added concept to the mind and every concept broadens and enlarges the mind to which it is an attribute.

Look at this from another point of view—the financial success, if you please. Wherever you go or whatever you do, you will find the trained man has the untrained man at a disadvantage. There is no better way on earth of thinning out the incompetent men in the professions than to bring trained men into competition with them. The man with the broadest training will not only be the better workman, he will also gain the best class of patronage. Acquaintance will tell here, for no matter how large the town or city there are circles within circles; people of culture and cultured taste find each other out. The professional man who knows things outside of "shop," who can mayhap scan a line of Virgil, or explain the binomial theorem, will find, other things being equal, more friends, more patronage, than he whose literature is confined to the daily newspaper.

George William Curtis is quoted as follows: "I have heard it said that a liberal education does not promote financial success in life,—a chimney sweep might say so; without education he could gain the chimney top—poor little blackamoor—brandish his brush and sing his song of escape from soot to sunshine. But the ideal of success measures the worth of his remark, that it may be attained without liberal education. If the accumulation of money be the standard, we must admit that a man might make money in a hundred different ways without education."

I maintain also that a man of cultured mind, who has thus drawn about him a class of patronage of self-respecting men and women, will be so self-respecting and so intelligent, that he dare not slight his work—that he must maintain a high standard of skill in his profession, that he must be well read, that he must attend professional gatherings, and know that the world moves, and that science is advancing. He will not dare to go backward, but must ever offer to his exacting patrons the best the world has known in special lines of scientific progress.

Nowhere on earth is the raw material cut of which scientists, scholars, statesmen, aye dentists should be made, so plentiful as right here in our own country. American dentists are generally conceded to be the most skillful in the world; this, more through individual capacity and native ingenuity than from any requirement of our dental schools—but skill plus wisdom will always be valued and paid for. On every hand we see new methods that demand not only more knowledge and skill from the practitioner, but more insight and sagacity, a higher degree of disciplined intelligence. What makes a surgeon great? Is it his manual dexterity, his manipulative ability? We have all seen a butcher with apparent carelessness whip his knife through the beef and sever it at the joint with utmost accuracy. Look at the hands and wrists of the pugilist Jeffries—then at those of Lorenz the surgeon; they are practically of equal strength—Jefferies uses his to punch men's bodies out of shape—no matter how; Lorenz uses his to punch them into shape, knowing exactly how.

Higher education is not a question alone of preparing great men for great things—it must also prepare little men for greater things than they would have otherwise found possible. As a good beefsteak disappears in a man and re-appears as energy and vigor, so is education absorbed, and re-appears as mature judgment, mental balance, keen, acute, grasping intellect. Is there a practitioner among us, not holding the degree of Bachelor of Science, Bachelor of Arts, or Doctor of Medicine, or otherwise, who does not bitterly regret opportunity slighted or unavailable? He would indeed be glad to possess them, not for the mere degree's sake alone, but for the education's sake. Doctor Butler, Columbia's new President, in his annual address, favors granting the Bachelor's degree at the end of two years of university study, leaving the Master's degree to be gained in two more. The Bachelor's degree, he says, would admit to the professional courses (note where he ranks our admission requirements) and be so arranged as to constitute a suitable foundation for them, or for courses in general science or letters.

Johns Hopkins has set a great example, not only to medicine, but to us, by demanding a degree for admission to its Medical School. And Harvard since 1901 has required a degree in Arts, Philosophy, Science or Medicine. This standard is none too high for best results in any professional work; he who has waited a year or two more to secure this degree will not be handicapped, even in this hurrying age. How few professional schools have entrance requirements that amount to much; they may have requirements that look well in the catalogue or annual announcement,—but most of them accept without question or investigation, certificates from teachers or obscure preparatory schools, and the like. There are approximately sixty Dental Schools in America;—to quote from a recent compilation,—"3 have no express admission requirements;—18 have purely grammar school subjects for entrance;—18 more, first year standing in high school work;—11 have requirements covered by about two years of high school work;—and 6 require a three years' high school course; none of them as much as is required for admission to any reputable college. Most medical schools are the same, simply requiring grammar school subjects—some demanding high school work;" but I am happy to say the Medical Department of the University of California demands full admission to the University proper, before a student can elect to take their course, and our next dental catalogue will, I hope, make the same announcement for the Dental Department.

Too often Dental Schools appear on the register as a department of some University, in most cases a relation existing only in name. When a Dental School is endowed or has its State behind it, it can and should exact the standards the good of the profession requires. Until then, it is at the mercy of the demands about it and its students are the product of its surroundings rather than the choice of the school.

I trust I have said enough to prove to you that the opportunities of modern dentistry are so new and vast, that an ampler education is needed by the practitioner of the future. We cannot give him that education in a four years' course at a Dental College—let him take ten, if necessary, with the preliminary—it will be worth the while, and his place in the professional world will wait for him. The four-year courses in our dental institutions will be well and completely filled with good instruction and practical work, and the teaching staff will no doubt be improved and methods strengthened and advanced. No more can be done by the dental student in those four years;—all he wants and needs, he cannot get in that period. Where, then, can we turn for the improvement and addition, if not to the period of preparatory school life? Note the difference in the ages of the applicants to our dental colleges nowadays—they used to be men grown, "gray headed undergraduates," as some one has said; now they are all boys, and the more reason why they should be better prepared. To fit a man into our schemes of dental education has been the mistake of the past; to fit our education to the well qualified man, the work of the future. If general culture is to be an element of professional success our colleges should say so to those who would seek to enter their doors, and say so at once.

At the risk of being tiresome I wish to briefly present to you what seems to me an ideal preparatory course, prerequisite to professional study:

A complete scientific course in a good high school with English for general culture; algebra and geometry for mental discipline and also because they are of help in the chemistry and physics later on. Two years at least of Latin, first for mental discipline and second because of its practical use in nomenclature and in anatomy; coupled with this a course of manual training. In the last year of the high school I would have the student take physics and chemistry in the laboratory, and biology in laboratory and field—not text-book knowledge only in these subjects, but the actual confronting of student with nature. In this way the student tests his knowledge for himself—he early acquires scientific methods in accepting no conclusion that is not demonstrated;—he is not entirely dependent on a teacher.

Now—send our boy to the University;—he takes a continuation of the chemistry, physics and biology, (because they are necessary for the later study of physiology, pathology, bacteriology and microscopic anatomy) histology from the highest plane;—and in addition a reading knowledge of French or German or both, (good, because, accounts of so much original work are published in these languages). During the two years required for this work, there should be added for the general culture of the well-rounded student, a general academic course in English Literature and American History.

Then he goes into the professional school proper. In the first and second year he takes anatomy, (gross and microscopic) physiology, pathology and bacteriology, under the guidance of men with the same scientific point of view and scientific methods as he had in the academic two years; in other words, men who are non-practitioners and men of productive scholarship; who devote themselves to the leadership of the student, besides giving a goodly amount of their time to original work and research. Nobody would select as professors of chemistry or mathematics in any university, a man in the employ of a gas company as chemist, or insurance company as expert statistician—yet that is similar to what most of our colleges have been expecting of their pathologist, bacteriologist or anatomist. In the leading medical schools of the world, these studies are in the hands of men who devote their lives to this special work instead of giving instruction in the intervals of a busy practice. During these two first years, the student takes his complete technic courses, operative, prosthetic and others, in completest detail; metallurgy, which is fundamental, and dental chemistry. Next I would have him take more or less internal medicine, pharmacology, and physical diagnosis. At the completion of these four university years he has earned and received his degree of Bachelor of Science. During the succeeding two years I would make didactic work merely incidental, devoting the bulk of the time at chairside and bedside. This would of course include the clinical work in dental pathology and therapeutics, practical orthodontia, oral surgery, and other practical dental subjects. I have mapped out a course—one that may be merely ideal, one, you may say, that disregards present conditions, one for which dentistry is not ready, and that will not be feasible in the immediate future.

My position may be too advanced, but what would be the result of realizing this ideal? We would bring in better men, superior men;—we would turn out real Doctors of Dental Surgery with a scientific degree as well; the doors of our profession would be shut against the trifler and the tinker, and we would reserve the training of our schools for those who bring to the work the instincts, traditions, and outlook of the scholar.

In presenting this paper to you I have borne in mind two essentials—the necessity for a high ideal, and the importance of urging it by sound arguments; I am sure of the one, and you are to be the judge of the other.

USING THE STEREOSCOPE WITH THE X-RAY IN DENTISTRY.

By J. N. MacDowell, D. D. S., Chicago, Ill.

In looking at an ordinary X-ray of an arm full of shot, we see nothing but a flat surface with the white spots scattered over it, indicating that the shot is located in the tissue; but whether deep-seated or near the surface, it is impossible to tell. Two pictures of the arm taken in the same position and placed in the stereoscope reveal the exact location of the shot in the tissue; for the use of the stereoscope gives depth and distance to a picture, if taken properly.

The area of tissue involved in and about the mouth is not so great but with the assistance of an external diagnosis one can almost guess the exact conditions, and in many cases the knowledge by an X-ray that a missing tooth is present or an abscess exists is sufficient.

But there are many cases that demand definite knowledge, such as the exact position of unerupted teeth, malformed roots, enamel nodules, holes drilled through the roots, broken drills, broaches, etc., as well as the location of abscesses, the root to which the pus sac may be attached, the correct diagnosis of root canals that have been filled, absorption of replanted or implanted teeth, etc., etc. Such experiments as watching the development of the permanent teeth and the absorption of the roots of the temporary teeth, the progress of an abscess, the minute examination of a root canal filling in the living subject, become easy, beautiful and valuable experiments.

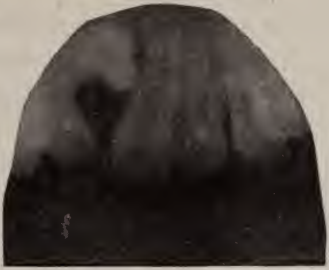

Fig. 1.

The X-ray, Fig. 1, is the ordinary kind, and was taken to locate the missing central, but there is nothing definite as to the exact position of the tooth, whether it is situated lingually or labially.

W. C. Fuchs, of the X-ray laboratory, suggested that if it were possible to locate exactly with the stereoscope bullets, shot, gall stones, etc., that it might be possible to do the same with the teeth, if a way could be devised whereby two X-rays could be taken from exactly the same position. In order to do this it is absolutely necessary that the two pictures be made without change in position in the mouth of the second plate from that of the first. Some difficul-

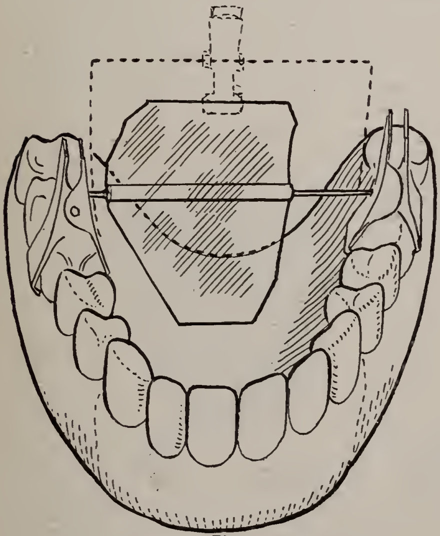

Fig. 2.

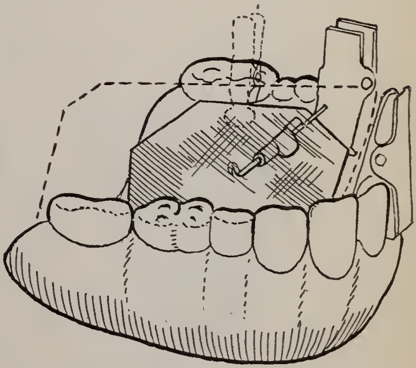

Fig. 3.

ties are presented in constructing an instrument to hold the plate. The probability of the patient moving between the first and second exposure must also be considered.

During the months of October and November, 1902, the writer carried on a series of experiments for the purpose of ascertaining if it were possible to take two X-rays of the same teeth within the limited space of the mouth for use in the stereoscope. A report of these experiments was made at the May meeting of the Chicago Dental Society. After some experimenting, with a few failures at first, the following simple method was adopted:

Small stationary clamps were used. To the side of the clamps was soldered soft, pliable wire. On one side this wire was soldered to a tube; on the other side to a piece of wire that fitted the tube. This made the clamps adjustable for a narrow or broad vault, the soft, pliable wire permitting the clamps to be bent around and adjusted to any position on the teeth. To the tubing was soldered a small plate of German silver. This instrument is clamped on the teeth of the upper or lower anterior part of the arch, as desired. Fig. 2. For the side another form of the clamp is used. Fig. 3. Measurements of the vault are then taken with thin cardboard to fit the instrument and the part to be taken. From this measurement, in the dark room, two sensitive plates are made exactly the same size, and then enclosed in separate pieces of black paper. Make the patient's head stationary with a photographer's clamp; insert the first plate, clamp to position in the mouth and expose. Then remove the first

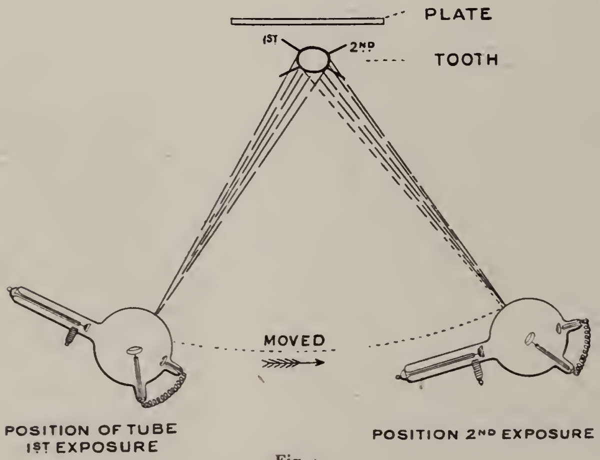

Fig. 4.

plate, cautioning the patient not to move. Insert second plate, clamp in position and move the X-ray tube three inches to one side; then expose. The reason for moving the tube is to secure both sides of the subject, as shown by the diagram, Fig. 4.

The three cases illustrated are far from being ideal cases for the stereoscope, hence they are all the more valuable, as they illustrate what can be accomplished.

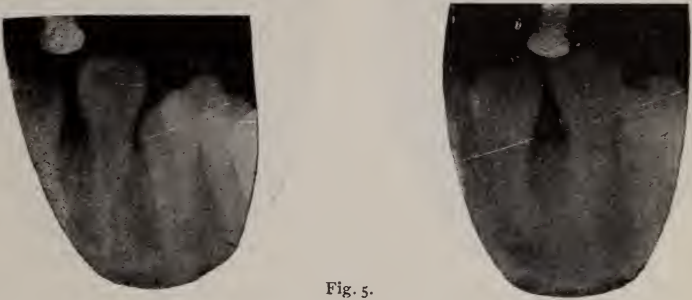

Fig. 5.

Fig. 5, boy 14 years. Exposure made for unerupted laterals. Note how clearly one can see around and beyond the central with curved root. Also note how clearly the tipping of the root labially is brought out.

Fig. 6, boy of 10 years. Exposure made for missing lateral. The lateral is deep in the alveolar process. Note how clearly the lateral stands out alone, well away from the central and cuspid lingually.

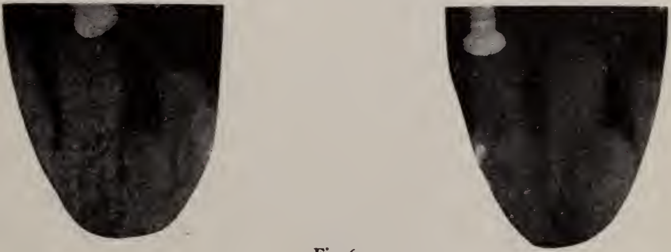

Fig. 6.

Fig. 7 exposed to determine the condition of the root canal fillings. The centrals are filled to the apex; the lateral filled only half way. The X-ray on the right was accidentally fogged by exposing to the light too soon.

When X-rays are reproduced by half-tone work what little clearness they may possess is dimmed in the reproduction; hence these reproduced X-rays will not show up clear and distinct like the originals.

Cut the pictures out and mount on a cardboard as they are; then view with the stereoscope. With an ordinary X-ray we see a flat surface; the use of the stereoscope gives us distance. We see into the bone, around and beyond the teeth.

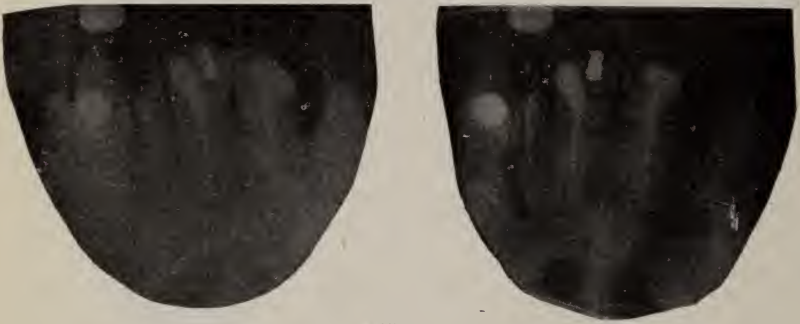

Fig. 7.

TAKING THE "BITE."*

By Hart J. Goslee, D. D. S., Chicago, Ill.

In view of the previous numerous and excellent contributions to the literature upon this subject, which are available, it would seem that but little remains to be said which might add anything new, or offer special emphasis, to the detail of a procedure so simple and yet, after all, so exacting. Indeed, the effort in this instance is warrantable only because of the importance which must be attached to this phase of a subject which is always interesting; and because of the frequency with which failures occur, and of the fact that this is the central link which binds together the two other stellar, but none the more important, topics which were expected to be included and presented in this so-called symposium.

"Taking the bite" is the commonly accepted but somewhat homely expression indicating the procedure incident to securing and reproducing the normal relation of the mandible to the upper jaw; and in the process of constructing artificial dentures there is probably no one detail which is more difficult to accomplish with certainty, which is of more material importance, or upon which the success and serviceability of the work is more dependent than this same procedure.

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*Read before the Odontographic Society, Nov., 1902.

This is particularly so in the edentulous mouth, where no teeth remain in either arch to aid and guide in ascertaining the correct relation; where all of the former characteristics have undergone the more or less pronounced changes which result from absorption; and where the normal closure may have become abnormal, to a greater or less extent, as the result of the acquired tendency to protrude the lower jaw until the summit of its ridge at some points may be brought into apposition with the upper, in the continued effort to partially masticate food between them without the assistance of teeth.

Yet while it is evidenced to a greater extent in this class of cases, from these to even the most simple ones, where natural teeth remain to aid in obtaining accuracy, the requirements are alike exacting and demand equally painstaking efforts.

In the edentulous mouth, however, it is to the afore-mentioned phase of the existing conditions to which may be attributed much of the difficulty so often encountered in the effort to secure the correct and normal relation; and which also accounts for the fact that, when the proper "bite" is secured, and artificial dentures constructed in accordance therewith, it is a much more trying ordeal for the patient who has gone without teeth for any considerable length of time to learn to use them successfully than it becomes for the one who has the artificial substitutes inserted soon after the loss of the natural ones.

While it may, or may not, have been generally observed, it is nevertheless true that the difficulties incident to learning to successfully use artificial teeth seem to increase in proportion to the length of time intervening between the loss of the remaining natural ones and their substitution by artificial means.

This is so readily apparent upon close observation that it seems but natural to deduce that the cause must be attributed to the establishment of this unnatural closure of the jaw, with a sliding forward and upward tendency which it is difficult to compensate for, and accommodate, in the construction of the dentures.

It is also quite reasonable to conclude that such a tendency, since we are creatures of habit, has become habitual, and that it has been acquired by the continued effort to masticate with the gums, in which endeavor it is usually necessary to protrude the lower jaw until it may be brought into a sliding inclined-plane contact with the upper in the anterior region, where such efforts are for the most part confined.

This simply means that the lower jaw is voluntarily or involuntarily brought forward, according to the degree of acquired habit, not necessarily into an uncomfortably, or consciously, abnormal position, but rather into an incisal relation; and this same condition would exist, and be equally evidenced, under like effort if only the upper teeth were absent, or even where any or all of the natural ones remained.

Where even all of the natural teeth remain in both jaws, and occlude normally, if the movements of the mandible in the exercise of its functional activity are noted, it will be observed that as food is taken into the mouth and comes in contact with the anterior teeth the lower jaw is immediately brought forward until the incisal ends of the teeth meet, for the purpose of incising; and that as it is subsequently carried back between the posterior teeth, relieving or diminishing the resistance at the former point, the jaw is also carried backward until it assumes the normal occluding, or masticating, position; but so long as anything remains between the anterior teeth which offers resistance the incisal relation will also remain.

This tendency toward protrusion into an incisal relation, then, is but the result of a natural effort to "bite" into that which affords resistance in the anterior part of the mouth, whether natural teeth remain or not, and in taking the "bite" it is this feature which accounts for the frequency with which unsuccessful attempts are made in securing the proper and desired occluding relation.

While the essential features incident to the requirements and to the detail of procedure in overcoming this tendency have been admirably presented by Dr. Grant Molyneaux (Amer. Textbook Prosthetic Dentistry, Chap. X, pp. 346); and have also been especially and particularly emphasized in a splendid article upon the subject by Dr. R. Ottolengui (*Dental Cosmos,* May, 1902), they are still and, indeed, must continue to be, of such importance as to warrant further repetition, at least until such time as they may be more fully appreciated and comprehended and successful results become more universal.

In the latter article the author designates the normal occluding position as being the "involuntary" closure, and the forward or incisal relation as the "voluntary" movement; and claims that, when the closure is made naturally and involuntarily, the jaw will be found to assume the normal occluding position; while a forward movement is made by the voluntary action resulting from an effort to bite into, or incise, that which offers resistance in the incisal region.

While both of these terms, when viewed from this application, may readily indicate the physiological action, and the relation of the jaws; and while the application is, in a measure, correct and true, at the same time it must be remembered that this more or less "voluntary" forward movement may be observed and executed by the patient so entirely unconsciously as to become practically involuntary, and to be governed and controlled by the requirements of occlusion, or the location of resistance.

This unconscious closure, so governed, accounts for the not infrequent presentation of faulty or incorrect results when a large mass of wax is placed in the mouth, and the patient requested to "bite" therein; and is the strongest possible reason for never giving such instructions; and an insurmountable argument against the probability of obtaining an accurate closure when the so-called "mush-bite" is used.

The employment of this latter slovenly and doubtful procedure is, in my opinion, at all times contraindicated in edentulous mouths or arches, and in all cases, excepting, perhaps, where occluding natural teeth remain, for the reasons mentioned; notwithstanding a statement to the contrary recently made by Dr. Eugene Pettit (*Dental Review*, pp. 112, Feb., 1902).

In this article the employment of such a procedure is advocated and claimed to be productive of "the most accurate results," for the following reasons: First, "there is no slipping of base-plates upon the surfaces of the mucous membrane." Second, "the patient does not have in mind the correct bringing together of the wax-covered jaws, but is requested simply to mash the wax, in which they think only of exerting a certain amount of force." Third, "it saves time."

In analyzing such possible advantages the first one scarcely merits consideration, because it reverts only to unskillful execution, indifference or negligence, for it is difficult to conceive of any reasonable excuse for the slipping of base-plates if they are well adapted to, and trimmed to the proper outline on, good accurate models; and if they are made of a material which will not be susceptible to a change of form at the temperature of the mouth; all of which are included in the requirements of a base-plate for this purpose, and may be easily obtained.

In the second instance the patient has no knowledge of, and should possess no information concerning, the correct or incorrect bringing together of the jaws; but, on the contrary, such movements should be entirely under the control of the operator, who alone knows, or should know, when the desired and normal relation has been obtained.

The operator who expected his patients to know this might also allow them to dictate as to the size, shape, color and arrangement of the teeth with an equal degree of reason and propriety, and yet hope to accomplish successful and artistic results as well.

Furthermore, having in mind the required exertion of force sufficient to "mash" the wax, when unequal resistance is offered, especially in the anterior part of the mouth, would be likely to do more to induce an incisal protrusion, and result in an incorrect relation, than most anything which could be so easily done to overcome it.

The third advantage claimed involves the only feature of any apparent importance. To say that the employment of methods which will save time should not be considered would be unreasonable, but to the conscientious operator, who is endeavoring to skillfully and artistically reproduce nature, and restore lost function, the application of such can never be made at the possible expense of accuracy.

While such a claim may always appeal to dental laboratories conducted by laymen, for purely commercial purposes, it should not influence those who, from desire or necessity, are compelled to patronize them, because where certain portions of the work are relegated to others who are unfamiliar with the conditions those methods which seem to be productive of the most certain and accurate results should always be employed.

While there can be no doubt that such a practice may sometimes be productive of good results, they are obtained because of the knowledge and experience of the operator, rather than because of the method employed, and are in any event less universally certain and positive.

In this particular connection I am also constrained to take issue with a statement made by Dr. Ottolengui, to the effect that it is unnecessary, except for purely cosmetic reasons, to try in the case prior to its completion.

This he regards as an acknowledgment of the doubtful accuracy of the "bite," but as this procedure is fraught with difficulties, and replete with uncertainties, whether there is any possible doubt or not, absolute certainty of the accuracy is made possible by trying in the case; and such definite assurance, combined with the timely opportunity for correcting defects and making desirable alterations, seems to make such a practice the only reliable one, and one which, particularly in full dentures, is invariably warrantable.

PROCEDURE.

In the procedure incident to obtaining the correct and normal occluding relation of the jaws good models are essentially the first prerequisite.

While those cases in which but one arch is edentulous, with all, or the majority, of the teeth present in the opposing jaw, present a more favorable opportunity for obtaining an accurate relation, because of the guide usually afforded by their presence; from these to the most simple ones, where even occluding teeth remain, the procedure is of such material significance, in view of the tendency mentioned, as to demand the most scrupulous and painstaking attention to details; and the difficulties encountered in the process will increase in proportion to the amount of absorption and length of time that the natural teeth have been lost, in the edentulous case, and the number of teeth missing in the partial case.

Base-Plates. When good models have been obtained a base-plate made of some material which possesses sufficient strength and stiffness to retain its given shape, when subjected to the temperature of the mouth, should be closely adapted, and then trimmed to follow the probable or desired outline of the denture, so that it may rest firmly in position in the mouth and admit of the free action of the muscles without being displaced.

In order that such requirements may prevail to the best possible extent, when swaged or cast dentures are to be constructed, this procedure should be deferred until the permanent base may be so employed, after it has been finally adapted and properly trimmed.

For the same reason, and because of the similar advantages, even in vulcanite work, the base may be made first, and used in taking the "bite," after which the teeth can be subsequently arranged and attached thereto. Because of the additional time thus consumed, however, in the necessity for two separate vulcanizations, this is scarcely warrantable, except in extremely difficult, or particularly doubtful, cases.

Temporary bases may be made sufficiently stiff and accurate to be serviceable for this purpose, and to answer for the trial plate as well.

The composition of shellac and wax known as the "Ideal" base-plate material, or any similar substance, is useful, and possesses some advantages, though modelling compound rolled out into thin sheets of uniform thickness, pink wax and paraffin, or thin sheet lead, may be employed.

In the use of the two former no additional re-enforcement or stiffening is necessary, but bases of wax should invariably be adequately stiffened to prevent a distortion of their form. This may be easily and quickly accomplished by adapting a piece of annealed German silver wire, about 16 gauge, to conform to the outline of the base, and securely sealing it with melted wax.

On upper bases this should be adjusted close to the posterior border, and extend across from heel to heel; and to the lingual surface from one end of the base to the other in lower cases.

In the use of wax, it is also advantageous to first cover the model with tin foil, as a means of facilitating the removal of the base from the model.

Full Cases. In full edentulous cases a rim of wax, of adequate proportions to amply restore the former ridge, which is now lost by absorption, to a greater or less extent, should be formed upon each base-plate, and securely attached thereto with a hot spatula.

When then adjusted to the mouth, the approximating surfaces of these wax ridges should each be gradually and consecutively trimmed with a warm sharp-bladed instrument, until a slight closure of the jaw will bring them into even and uniform contact at all points; with the dividing line indicating the exact length of the lower lip line. While this may require that one ridge be trimmed more than the other, or that an addition must be made to one or the other, such a procedure becomes necessary, for the reason that the lower lip line almost invariably indicates the correct length of the lower teeth.

When this has been carefully observed attention should then be given to the restoration of the middle features of the face, which should be done at this time by trimming away or adding to the wax, and is a most important detail, as a means of furnishing an accurate guide to the proper arrangement of the teeth and waxing of the case.

No special attention need be given to the correct closure of the jaw until these procedures have been observed; after which the patient should be then requested to open and close several times, but not to "bite," with the base-plates held firmly in their proper position, in order that their contact may be noted.

This also serves to place the movements of the jaw entirely under the control of the operator; and the absence of resistance to the closure, which is made possible only by a uniform contact of the bases throughout their entire length, relieves the tendency to incise, and thus increases the opportunity for securing a normal occluding relation.

When such a relation has been obtained the bases should be united securely with a heated spatula, or by the use of two or three small double-pointed tacks, so that they may be subsequently withdrawn *in situ.*

The median line should then be indicated by making a vertical incision in the wax at the proper point, and the length and curvature of the upper lip when raised to its highest muscular elevation, then similarly designated, which latter serves to indicate the length of teeth required in the individual case.

The bases should now be removed; immediately placed in position on the models; sealed to them with a hot spatula; the median line then also indicated on the models, and the whole mounted upon the articulator in accordance with the usual methods pursued.

The simplicity and possible accuracy of this procedure in detail will depend much upon an absolute uniform contact of the opposing surfaces of the wax ridges, as it is only by this means that no resistance to the closure will be offered; and that no displacement of the bases will be occasioned.

This latter is an almost equally important feature, for the reason that if the wax ridges come in contact at one point only one or the other, or both, bases may be displaced without the knowledge of the operator. In such instances a faulty occlusion which may be hard to account for would result, because the accurate relation of the models is co-dependent upon the bases resting firmly against the tissues of the mouth.

The not infrequent occurrence of faulty occlusions where nothing but the posterior teeth strike when the dentures are completed and inserted in the mouth; or where only the anterior teeth can be brought into contact, and a considerable space exists between the posterior teeth, may often be accounted for in this manner.

While these principles and this detail have been designated as that required in full upper and lower cases, the same procedure is also applicable to, and indicated in those cases where some teeth remain in one arch, and a full and partial denture is to be constructed for the same mouth.

Single Cases. Practically the same details should also be observed in those cases where the substitution of artificial teeth is required in one arch only, and where they are to occlude with the natural teeth of the opposing jaw.

In this class of cases the base-plate should be adapted and a ridge of wax added and attached, as outlined. It should be then adjusted to place in the mouth, and the surface of the ridge consecutively trimmed in like manner, until its remaining proportions sustain the jaw in a relatively normal pose when the teeth are in contact with it, and adequate restoration of the facial contour is afforded.

This trimming of the surface of the ridge of wax should be done carefully, so that all of the incisal and occlusal ends of the opposing teeth come in contact with the center of the ridge, evenly and uniformly, without any effort to "bite" into it. By this means the proper relation of the lips, and of the chin to the nose, is obtained and sustained, and no resistance is at any time offered to induce an incisal relation.

After this has been observed it then becomes necessary to secure a good imprint of the opposing teeth. This may be most accurately accomplished by first placing a small roll of soft wax, plastic enough to offer but little, if any, resistance, on the posterior ends of the base-plate, into which an imprint of the posterior teeth only may be first obtained, by requesting the patient to close gently, with supplementary instructions to swallow while closing.

The soft yielding wax placed first in this region only will overcome the tendency to incise, while closing, to a very great extent, if no effort is made to bite into the hard rim of wax, and after the correct occluding relation may have been secured in this manner, the base should now be removed and soft wax then placed around the anterior part.

Upon readjusting to position, the imprint of the full complement of teeth may be secured accurately, even though some little resistance be now offered, because of the guide thus afforded by the previous imprint in the posterior region, and it should be observed that the same closure is obtained.

In extreme cases, where the slightest resistance seems to promote a tendency to protrusion, the surface of the wax ridge may be roughened, and the primary relation in the posterior region secured with thin plaster. This offers even less resistance than wax, and if the proper relation be so obtained on one side wax may then be employed for the remainder, using the original imprint in the plaster only as a guide, as suggested by Dr. Ottolengui.

While it may often be possible to secure a sufficiently deep imprint of the opposing teeth in this roll of soft wax to give a reproduction of adequate length and accuracy to facilitate the articulation and occlusion of the teeth, it is usually the best practice to take a modelling compound impression, obtain a model from this, and adjust it to the "bite" prior to mounting upon the articulator, as this, of course, affords a longer and more perfect reproduction of the remaining natural teeth, which is always advantageous.

In upper cases the median line should invariably be marked in the wax, as indicated, because the fraenum and lower teeth do not always serve as accurate guides; and the high lip line is also useful, for the reasons mentioned.

Partial Cases. The variation of detail in partial cases will depend entirely upon the number of natural teeth missing in the individual case.

In those cases where a majority of the teeth are to be supplied, and the remaining natural ones do not establish the correct, or desired, occlusion, by opposing each other, base-plates should be adapted to the model, trimmed to fit around the remaining teeth, and built up between them with a rim of wax, which will meet the previously mentioned requirements in this connection; after which the same detail of procedure should be observed if the most accurate results are to be secured.

In smaller cases, and where the correct occlusion is established by the presence of several opposing teeth, base-plates may be dispensed with, and the proper relation and desired imprint obtained with a simple roll of soft wax at the time of taking the impression; or where the remaining teeth will admit of the proper adjustment of accurate models an impression of the opposing jaw in modelling compound may be all that is required.

In the use of a simple roll of wax, however, only enough to insure a good imprint of the teeth of both jaws, and the ridges, should be employed, and it must be observed that the closure is made with an occluding relation, which observation is more or less obstructed by the presence of too much wax.

Obtaining the occluding relation may be facilitated by requesting the patient to close and bring the posterior teeth in contact, and when it has been noted that such a relation exists an additional depth and more accurate outline of the teeth, which is desirable for the purpose of affording a better reproduction of the occluding teeth, and admitting of a correct adjustment of the "bite" to the model, may be secured by pressing the wax down closely around the buccal and labial surfaces with the thumb or finger and instructing the patient to hold the teeth in firm contact, and do likewise on the inside with the tongue.

The "bite" should be then carefully removed, to prevent changing its shape; securely adjusted to position on the model, and the imprint of the occluding teeth moistened and well filled with plaster in mounting upon the articulator, to preclude the subsequent presentation of imperfect or inaccurate reproductions of the teeth.

While various devices and appliances for ascertaining, controlling and facilitating the accuracy of this procedure have been from time to time suggested and employed, none have proven to be universally applicable or successful, and the best results still depend upon a comprehension of the conditions; an appreciation of the requirements and a systematic and careful execution of the details.

To some this may seem like a wasteful expense of time and energy, but the additional time consumed is practically infinitesimal when the increased opportunities for accuracy are considered; and in this connection it must be remembered that it does not matter how good the models may be, or how nicely the teeth are arranged, if the "bite" is incorrect the case is a failure.

ANTISEPTIC FILLINGS.*

BY EDWARD A. ROYCE, D. D. S., CHICAGO, ILL.

The success or failure of dental operations depends as much upon the qualities of the material used for filling as upon the skill with which it is inserted; this is true not only of cavities made by decay, but it applies with equal force to the filling of pulp chambers and canals, so I wish to call your attention at this time to antiseptic fillings. The researches of recent years have shown us so conclusively the extent to which the dentine is infected in advance of decay that we should meet that infected condition by the application of a permanent antiseptic after the cavity has been made as nearly aseptic as possible. Of course in the ordinary cavity that can be thoroughly cleared and stopped so that moisture and air will be excluded; an aseptic filling is all that is needed, but there are many cases where such removal of infected dentine is not possible, and we find the perplexing condition that arises when decay has penetrated nearly to the pulp, so that when the cavity is cleared the pulp is almost exposed, or it may be that the cavity can not be cleared in the ideal manner, and a little of the discolored dentine must be left over the pulp or it will be exposed and a capping resorted to. In cases of this kind of course a non-conductor must be used to protect the pulp from thermal changes if a metal filling is to be inserted, and cement seems to be the non-conductor in most general use, but the death of pulps has been so frequent under cement that many will not use it. I have heard dentists of repute go so far as to say that they never put cement under a gold filling that the pulp did not die. These deaths have been variously ascribed to the phosphoric acid which is one of the constituents of cement, and also to arsenic, which it is claimed is found in certain makes of cement, and various other causes have been brought forward from time to time to account for the demise of the pulps that are so treated. The uncertainty in the treatment of these cases causes much anxiety to the dentist who desires to do everything that can be done to preserve to usefulness and beauty the natural organs.

In the treatment of a tooth under these conditions there is one thing necessary that has not been insisted upon, and that is permanent antiseptics. In using a cement in a deep cavity it is customary to introduce for a moment a little carbolic acid, one in one thousand bichloride of mercury, or something of that kind, and then dry and fill. Now, let us look for a moment at the foundation upon which the house is to be built. It has been shown beyond a doubt that bacteria penetrate the dentine some distance ahead of real decay, and many times this advance guard of decay is a surprisingly long way in the lead, so that in cavities such as we are speaking of the dentine that forms the pulpal wall of the cavity is sure to be thoroughly infected with bacteria. It has been repeatedly proven that an immediate sterilization of this portion of dentine is not a permanent sterilization, and the germs soon resume their operations. Now what do we consider proper to place over this infected territory of dentine? I presume that a very large majority of the profession use oxy-phosphate of zinc in a place of this kind, and this is all right until such time as the bacteria begin their new life, and then it becomes a reservoir for the secretions of the bacteria, to say nothing of its being a home for them. If for a moment you doubt this, think of the last cement filling that you removed from over a dead pulp and your doubts will vanish as the odoriferous memories float back upon you. Have we not in this a sufficient cause for the numerous deaths that are recorded in the pulp family? Is not the irritation from such a mass of pollution sufficiently great to destroy the vitality of any pulp? Surely a large percentage can be accounted for in this way. Now, if this is the cause of our trouble can we not find a way to relieve it? The proper prescription for cases of this kind is, first, immediate sterilization and then the placing of a filling that is and will continue to be antiseptic.

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* Read before the Odontological Society of Chicago, December, 1902.

Different antiseptic fillings have been tried with varying success. Perhaps the one that has given greatest satisfaction is an antiseptic incorporated in oxy-phosphate of zinc; this gives a good foundation for a metal filling and has sufficient strength to protect the pulp from pressure. Probably hydronaphthol is the antiseptic that has stood the test of time better than any other when incorporated in oxy-phosphate. This was recommended by some one years ago, but the infected condition of the surrounding dentine was not so well understood then as now, and the necessity of antiseptic qualities in a filling were not appreciated, hence it never came into general use.

Hydronaphthol is too well known to need any description at this time. The first and greatest claim it has for attention is that it is a powerful antiseptic, and at the same time is non-toxic and non-irritant, and what to us as dentists is very important—the odor is not disagreeable. For convenience in using I keep hydronaphthol mixed with cement powder in the different proportions I generally use. I mix by weight, using one part hydronaphthol to five of powder, also one part to ten, one to twenty, one to thirty, one to fifty and one to one hundred. With these different proportions prepared and put in bottles, I can use them as readily as the plain cement powder. In a cavity so deep that I know I am unable to remove all the infected dentine I use the proportion one to one, or one to five—to be covered with one to one hundred, or clear cement or amalgam. If I want to put a non-conductor under gold I use one to twenty, under an inlay in a deep cavity I use one to twenty or thirty, for filling a pulp chamber one to twenty, for setting an inlay one to one hundred.

The uses of antiseptic filling material as outlined has been before the profession for years, but I have found other conditions that seem to demand a permanent antiseptic even more strongly than those detailed, and to the use of hydronaphthol in these places I wish particularly to call your attention. I have been using the mouth as a laboratory for my tests for a number of years, and the results have been so uniform and satisfactory that I feel warranted in bringing the subject before you. One of the most disagreeable things the dentist has to do is to take cement out of an old gold crown. The vile odors that issue from the old cement are one of the most positive proofs we have of the need of permanent antiseptic filling material. Hydronaphthol cement comes to the rescue in this respect. If for setting crowns a cement is used composed of one part hydronaphthol to twenty or even thirty of cement you will get the odor of the antiseptic when removing the cement from a crown, even if it has been in use for years. If there was no other virtue in antiseptic cement it would repay the dentist to use it for this alone.

The place where a permanent antiseptic filling material is most necessary is in root fillings. Almost all materials under the sun, from beeswax to gold, have been recommended from time to time as a root filling, and it seems almost too bad to try to spring a new one on you, and really I will not do so, but will present to you an old friend with added virtues, which seem to increase very materially its usefulness as a root filling. The number of root canals that remain aseptic after filling is comparatively small, and this is hardly to be wondered at if we consider the conditions. After the pulp has been removed and the canal sterilized and filled with whatever material seems best, there is left in the tubuli of the dentine quite an amount of organic matter which has of necessity more or less moisture and is kept at all times at just the proper temperature for the growth and activity of bacteria, and that they improve their opportunity is proven by the odor that emanates from the root canal when we remove the filling if it has been in place for a length of time.

Pink gutta percha is very extensively used as a root filling, perhaps more so in this immediate section than elsewhere. It has many very desirable qualities, but it generally takes but a short time for it to become offensive. The usual form of gutta percha root filling lacks something which is essential if we would obtain the best results from its use. To remedy this, I began some years ago to add hydronaphthol to the chloro-percha, gaining in that way the benefit of a powerful antiseptic, and while this was a great improvement it did not entirely satisfy me, as a large part of the root filling is made up of ordinary cones. To overcome this I began to make my own cones of gutta percha, into which I incorporated five per cent of hydronaphthol, which gave a very decided hydronaphthol odor to the mass of gutta percha. These cones I use in conjunction with the antiseptic chloro-percha, thus making a filling which not only remains aseptic after being introduced into the root canals, but will exert a very powerful antiseptic influence upon the surrounding dentine.

My tests have been made in the mouth instead of the laboratory, and while this is a slow method you have positive results, as the test fillings are subjected to the same conditions which other fillings will meet in the mouth.

I have called your attention to the antiseptic gutta percha root canal filling as an adjunct to the antiseptic treatment as usually practiced, believing that it is a long step toward the satisfactory management of pulpless teeth.

A PLEA FOR PROFESSIONAL UNITY IN OPERATIVE PROCEDURE.*

By Charles E. Bentley, D. D. S., Chicago, Ill.

The laws governing the method of extension for prevention are well digested and rational. It is a system. It is the only system ever given to the profession of dentistry for the scientific management of cavity preparation. It is founded upon scientific laws and has its justification in the accumulated clinical experience of modern dentistry. Its acceptance by the profession has been tardy because it is revolutional. Permanent reforms come through evolution, not revolution. Its resistance has been largely a matter of geography. This is natural for obvious reasons that need not be here exploited. This utterance is a plea for professional unity along such lines as affect our daily professional life. It is a matter of regret that sectional differences should blind us to truth, especially if it be illumined by the light of experience. Its tendency is to foster traditional jealousies and discourage co-operation without correspondingly good results. The only homœogenity that the profession greatly needs is homœogenity of attainments and impartial science. Let this be its high aim and geographic differences will soon disappear.

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*Read before the Minnesota State Dental Society, September, 1902.

Before we attempt any discussion of our subject let us have a clear understanding of its meaning. What is "Extension for Prevention"? Simply stated, *it is the extension of the margins of a cavity to zones where they will be kept clean.*

What are the vulnerable zones upon a tooth's surface that are most susceptible to decay after a tooth has been filled? The labio-gingival and linguo-gingival angles, the incisal angle and the gingival third of labial and buccal surfaces.

What are the natural agencies that will keep cavity margins clean? The lips, tongue, excursions of foods in the process of mastication and the gingivae.

How can this be proved? The accumulated clinical experience of modern dentistry teaches us that caries does not recur at these points where these agencies have their greatest activity, provided there is no defective surface in the enamel.

Has this method been in practice before G. V. Black gave it to the profession, and with what results? Yes, by many, but notably by Drs. Varney and Webb, who practiced extensively the method long before the name of Black was a professional talisman, and their names have come down with the ages as a consequence, as being the operative Titans of their times.

These men, living in a period when bacteriology was in embryo and histology unknown, unconsciously shed a light that penetrated the ages that were to come. Some have caught its glorious inspiration, others are traveling the beaten paths of error, blinded by the blinkers of prejudice.

Dr. Black, living at a time when the sciences were more definite and advanced, was enabled to positively formulate laws for the exact management of cavity margins, with the idea of their immunity from recurrence of decay.

What are the objections to this method? It is claimed that such destruction of tooth structure is unwarranted and unnecessary. Webb is quoted as saying that he would rather risk one of his fillings to the ravages of decay than the best tooth he ever saw; while this may savor of self-laudation, it has in it, however, a grain of truth worthy of consideration. A tooth with an adjoining one in normal alignment, properly filled in accordance with the methods of extension for prevention, is less liable to decay and has a longer lease upon life and usefulness than its neighbor similarly situated, which may be perfectly free from caries and in form and function perfect.

There has been no satisfactory objection offered to the principles involved in the method of extension for prevention. Desultory efforts have been made here and there, but nothing that is complete and satisfying. The East seems to have led in this propaganda. Time and again some strong opponent to the method has singled out some point and assailed it with his might; but after a complete digestion of the whole case extension for prevention stands unimpaired.

The most unsatisfactory assault of this kind comes from the pen of Dr. Geo. S. Allan of New York, in a paper read before the New York Institute of Stomatology, Jan. 7th, 1902, and published in the *International Dental Journal* of May last. I have carefully read and re-read this article in the hope of finding some justification or some better recommendation for the thing assailed. The only approach to this is his sweeping statement, which is as follows (page 320): "If the carious portion of a tooth be carefully removed and the cavity thus formed kept clean and free from caries-producing germs, no fresh decay will follow." The gentleman's meaning is somewhat cloudy, for he does not tell us whether to fill this cavity or keep it open, and further does not enlighten us how to keep the teeth clean from germs that produce caries. In the light of Dr. J. Leon William's investigations and conclusions I should imagine this would be a difficult matter with the present means we have at our command. In other words, this method would supplant the one of extension for prevention by keeping the teeth of patients clean. This we all know is not possible, for the simple reason we cannot control our patients to the extent of teaching them to clean their teeth so as to preclude caries, and in many instances I doubt; were we to have them in our offices each day whether we could prevent caries in some mouths. How much better, then, does it not seem to place those teeth that are to be filled in such a condition where the lips, cheeks, tongue, gingivæ and excursions of food will do this cleaning for us! This seems rational.

In the light of investigations of Miller, Black and Williams the term "clean" becomes a scientific one. While the term gelatinous plaques, with its significance, is still in discussion with these gentlemen, all seem agreed that they are concomitant with caries. Black and Williams advocate that plaques are attached to the surface of the enamel, while Miller is disposed to the opinion that this film has its attachment upon the enamel cuticle and produces strong argument in its favor. However this may be, he goes to great length to show that bacterial films or plaques are not restricted to carious teeth, but, as he says, are "characteristic of dirty teeth, or rather of teeth whose surfaces are not perfectly cleansed either by natural or artificial friction." He says further: "We may put it down as an axiom that films will be found wherever the surface of the teeth are not kept clear from deposits of mucus, epithelium, food, etc." His experiments in this line are most interesting. From two large jars containing approximately 1,000 teeth in dilute alcohol he picked out 100 of the best, washed and stained them. "I was surprised," he says, "at the universal presence and extent of the films. Of the molars and bicuspids only the cusps and usually a small portion of the buccal—less often the lingual surface were found to be free from film. At the neck of the teeth, where the enamel was completely protected by the gum, there was no film." Lastly, he made some experiments upon the teeth of Dr. Lawley York, whom many of you know and remember what care he gave his teeth. Dr. Miller describes Dr. York as an immune, and found the film restricted to the cervical and approximal surfaces.

Now, in the light of these investigations, will Dr. Allan and his supporters arise and tell us how we can keep the teeth of our patients clean? Natural or artificial friction fails to keep them free from debris. After a thorough cleansing these films quickly reattach themselves and remain adherent until removed by some frictional force. Whether these plaques have the significance attached to them by their champions is a question that bacteriologists will have to decide. We do know that they are found in abundance upon dirty teeth and that the cleanest are not free from them. Clean teeth, then, is a consummation devoutly to be wished for.

It is not necessary in this presence, where so many high priests of extension for prevention exist, to go into the details of this method. Briefly stated, in approximal cavities of the six anterior teeth, with a healthy gingivæ, it is good dentistry to carry the gingival wall under the gum, and this wall should extend gingivo-labially and gingivo-lingually to include the gingivo-labial and gingivo-lingual angles. This extension is made for the reason that the great abundance of clinical experience teaches that when fillings are not carried to and beyond these angles decay is most likely to recur at these points. The act of mastication separates the food at the contact points, and the cheeks and tongue directing the food in its excursions mechanically cleanse these surfaces, and thus the danger to those most vulnerable points is reduced to a minimum.

Another important extension in this class of teeth should be incisally. This extension should be beyond the point of contact toward the incisal angle in order to protect the incisal margin from the films that may lodge between the teeth and cause a recurrence of caries at the incisal margin. A terse sentence from Dr. Black epitomizes this condition very forcibly. He says: "If the central portion of the area be cut out, when decay has first appeared, and a filling made ever so perfectly, the conditions remaining otherwise similar it will only be a question of time until decay will destroy the remaining portions of the unclean area immediately adjacent to the margins of the filling."

In the bicuspids and molars the same laws governing the anterior teeth with reference to extension apply save that in the buccal and lingual walls the lines of extension are parallel to the bucco-gingival and linguo-gingival extension, and should include the occlusal surfaces.

The gingival, buccal and labial surfaces, by reason of their locations, are particularly vulnerable to caries. The extension of their margins should be such as will place them in zones that are not susceptible to carious processes as now understood.

Now, in a general way, this outlines extension for prevention. There are some conditions that would prevent the full operation of this method in all cases, such as old people, with approximal cavities in bicuspids or molars, not extending to the occlusal surfaces, with extensive recession of gum tissue. In such cases it were far better to cut from the labial surface than to enter from the occlusal surface. In cases of extremely nervous persons in whose mouths any kind of dental operation may cause extreme pain and consequent discomfort, one is justified in sacrificing his ideal for the nonce, and doing the best thing for the case at hand. This class of patients should be made to understand that the work done was in accordance with the exigencies of the case, and that constant vigilance on the part of patient and operator was necessary to preclude future serious damage. I do not believe that children should be compelled to stand this class of operations. One important fact remains to be considered. It is pretty generally recognized today that the teeth are less prone to decay after the individual has reached the age of 25 years. The "critical period" is recognized to be between 12 and 25 years. With this in mind, it should influence our judgment in reference to extension for prevention. A conservative law might be that whenever practical all persons presenting themselves to us for treatment between the ages stated we should practice extension for prevention in the class of cases considered. In persons beyond that age it should be a matter of discrimination and largely determined by the conditions present. You must not conclude from this statement that one is immune from caries after the age of 25 years, for caries is the result of environment, the exact cause of which little is yet known. But with the oral fluids in a normal condition one beyond this age is less susceptible to caries than earlier in life. Again, one may be immune from caries and suddenly become susceptible after a lapse of years. This subject of immunity has as yet been untouched and is but little understood. Serum theraphy may give us some day some light upon this interesting but benighted subject. With these exceptions, extension for prevention should be practiced wherever dentistry has a foothold among civilized men and women.

There are two causes that have militated against the general acceptance of the principles involved in Extension for Prevention. The first is a misconception of the application of its laws and the second, the extremist who preaches and practices radical Extension for Prevention at all times and under all conditions.

I am justified in the first assumption by the repeated papers and cuts that have appeared in the journals upon the subject, which undoubtedly show that their interpretation, and hence their conception, has been wrong, and upon which their criticism is built. This was most apparent at the meeting held by the Institute of Stomatology in New York referred to above. Dr. Gillett in no uncertain tone called the attention of the meeting to the fact, and practically told its members they had misconstrued the true teachings of Dr. Black, and that their criticisms were based upon the diagrams and drawings which exaggerated the true ideas taught by him.

The second assumption is a logical corollary of the first. If these gentlemen of the East had an exaggerated idea of Extension for Prevention, some over-zealous disciples of the theory must have been responsible for it in its exemplification. This usually is the case in any innovation, and this method has not escaped.

The extremist is responsible for a prejudice that exists in some quarters against this method, by reason of his untempered radicalism. Let those of us who are interested in true professional unity do what we can to remove the misconception and modify the extremist.

The fight for this theory and practice has not lacked brave leaders who have suffered the slings and arrows which is the usual fortune of a reformer.

The reformer is a block out of the future, misfitted into the structure of the present. He is refused, he is reviled and too often hands are laid upon him to wrench him from his fastenings. If he be genuine, if truth be his organic basis, not all the forces of nature can stir him from his placing. By and by the recurrent years, bringing with them the winds and rains of growth and progress, pass kindly over the edifice of which this is a part, smooths and transforms all the other blocks to his shape, and the world adds one more perfected edifice to its store. "The stone which the builders refused has become the head of the corner stone." No phase of human life has been exempt from this tragedy of progress. He who would change existing conditions in any line of human activity must receive the lash before he attains the laurel.

Dentistry, that young and lusty profession which is so vigorously pushing its way forward among its brother professions, can show more than one instance of this endless conflict between progress and conservatism.

Nothing presents a more conspicuous example than the phase of Operative dentistry we have spoken of.

The men who have been its earnest advocates have suffered sharp criticism from one part of the country, but have been bravely upheld in another section; so that in this matter we almost see the professional world divided into sections of East and West. But it cannot be otherwise than that in time this rejected stone, so to speak, will be gladly accepted, even in a quarter where it now seems least welcome, and in the near future it will be the head of the corner stone in operative dentistry, wherever it is practiced and in whatever region of our common country.

PROCEEDINGS OF SOCIETIES.

ODONTOGRAPHIC SOCIETY OF CHICAGO.

FIFTEENTH ANNIVERSARY CELEBRATION, TUESDAY AFTERNOON SESSION, FEBRUARY 17, 1903.

Dr. Harry P. Carlton, of San Francisco, California, read a paper entitled "University Training and Dental Education."

The discussion was opened by Dr. H. W. Morgan, of Nashville, Tennessee.

MR. PRESIDENT AND GENTLEMEN:

The paper we have just heard has been one of unusual pleasure and entertainment to me, and this body and the essayist have my congratulations. It shows very great care in its preparation and a thoughtful consideration of the subject. It is a strong presentation of a most inviting side of dental education, and I feel myself very greatly honored at being selected to discuss it, and especially so since the long and close friendship which has existed between the essayist and myself frees me of any charge of personality in whatever I may choose to say. As the essayist confesses, that he may have mapped out a course "that may be merely ideal," it was impossible for him to have done less or painted the situation and the remedy in other colors than those he has used, and I am forced to conclude that, had I been its author, I could have not done otherwise than he has done, except, possibly, that I might have modified some of the sentences relating to the history of the recent past. Dental education, dental science and dental literature have in the last few years made substantial and most gratifying progress. In fact such substantial advancement that there is no longer a question as to the status of the profession. No need to ask the question, "Is dentistry a learned profession?" That the standard of dentistry is not as high as medicine, law or any of the learned professions I repudiate. Nor do I believe the instruction given inferior to that of other professional schools, and I am just as confident that the material received into our ranks is as good as that seeking other high callings. I do not believe that the essayist or any other person can successfully maintain or offer any good proof to the contrary. The consideration shown to the worthy members of our profession by those high in public esteem everywhere is of such a deferential character that it at once settles the question as to the social and scientific position of dentistry. I am sure that the scientific work of many eminent dentists both in this and foreign countries will rank with that done by other scientific men. The essayist has fallen in the common error of condemning the instruction given in our dental schools as unscientific and gives color to this popular belief, that it is not as good as it might be because he himself is a school man.

Your essayist pleads for a "high grade of young men," and has outlined a course of preparatory work which would, if adopted, drive them away from us and indeed keep them so long getting ready that they can never be expected to acquire a manual dexterity, without which they can never become dentists. I must contend that it is merely an assumption, not indeed warranted by fact, that highly developed reasoning faculties "can come only after years of systematic pursuit of what may be called higher or University studies." Who are the foremost men in the world's commercial affairs today? Edward Bok has recently answered this question as follows: "The President of the New York Central was a freight clerk. The President of the Southern Pacific was a clerk. The President of the United Steel Trust a laborer. The President of the Pennsylvania R. R. a surveyor. The President of the Metropolitan Street Railway Co. a flagman. The President of the Western Union Telegraph Co. a telegraph operator. The President of the largest bank in America a messenger boy." Not one a graduate of an university, yet would even our essayist say these are men without highly developed reasoning faculties? But, Mr. President, I would have you remember that it is only an "ideal preparatory course" that the essay has offered us—and the "ideal" has so blinded him that he has entirely overlooked the conditions that dental education of to-day has to meet. His ideal is at least one hundred years ahead of our time. I doubt if then, unless human conditions are wonderfully improved, such requirements can be met. Nowhere in nature is rapid growth indicative of strength or permanency, and to jump our preliminary educational requirements to the standard Dr. Carlton has erected would be to close our college doors for at least five years for students to prepare themselves to enter. To answer the question, "do we want to be adjudged a merely high class mechanical vocation or a broad-minded, intellectual, scientific profession?" one has only to point to the curriculum of any of our dental institutions with their provisions for laboratory work in chemistry, pathology, microscopy and other scientific technic courses.

However much we may desire ideal conditions with scientifically trained and mature minds, we must recognize the fact that all of the earth are not demanding the services of experts or able to reward them for their services. Would the essayist have us forget the multitude who must suffer and who are scarcely able to compensate the humble follower of Chapin A. Harris, who is content to dwell in a log cabin on the mountain side and labor among those in a miner's camp? His duty is as high as he whose lot it is to serve the millionaire!

What are dental schools organized and endowed for? To turn out unique and exceptional graduates, to be compared with men of attainment in other lines of life, or graduate men to best serve the needs of the public? The ideal graduate may be able to make this "a larger and better world to live in"—but he will do so only as he is able to render some practical assistance to his fellow man. The highest aim of education therefore is to fit a man for service to humanity, not in the usual utilitarian sense, but in the larger, broader and better sense of being able to do something better than another. One of the greatest evils of today is the introduction into our educational institutions of too many subjects. The work is so diversified that much of it results in confusion and lack of completeness.

The function of the school is not to turn out the finished product, but do such preparatory work and training in the art of learning that the pupil will become so enthused and filled with aspiration that there will be, year by year, ever after a continual growth and development. A man's education, therefore, is never complete.

What is a liberal education? asks Edward Everett Hale. Is it a painful acquirement of a half knowledge or a whole knowledge of Latin and Greek? A man may have a liberal knowledge education who cannot read, write or speak either language. Nor is it a state of information about things. He defines a liberal education as an education which enables a man to speak the language of his time and understand it when it is spoken. A liberal education is an education which tells a man how he can learn what he wants to know.

I would not undervalue scientific training, nor am I making a plea for a low standard of preliminary requirements, but I do most earnestly protest that the essayist has placed his ideal too high.

In making this plea I would not be understood to discount the culture value of education, but when a man's education elevates his esthetic nature until he is so far above those he is to serve it may become a disadvantage to him and his profession. In conversation recently with an educator, one who had educated three brothers, it developed that two of them had completed their University courses, while the third had been forced to leave college before he was sufficiently prepared to enter the University, that he might support an aged father and mother in their declining years. Beginning at the very bottom there was nothing too low, degrading or menial in anything he encountered, and in seven years he was not only able to take care of his father's family but had accumulated quite a little independence, and when asked the difference between him and his brothers, who had not done so well, he replied, "Oh! these University graduates are afraid that they will get their hands soiled."

There is too much truth in the answer made to the editor of a Western newspaper, who sent to all the successful men of his city the question, "Why is it that not more of our young men succeed?"

One answer came in this laconic phrase, "Because too many of them are looking for white shirt jobs." Young men want to succeed, but they are unwilling to work for it.

I am convinced that too great stress has been laid on the length of terms and number of terms a man must attend a dental school before graduation. The quantity and quality of work should count rather than attendance. In his recent report to the Board of Overseers President Elliot, of Harvard University, is quoted as saying:

"The highly educated part of the American people does not increase the population at all, but, on the contrary, fails to reproduce itself."

It is probable that the regrettable result is due in part to the late postponement of marriage on the part of the educated man, a postponement which the protracted education now prescribed for men who enter the learned and scientific professions makes almost unavoidable.

I would not be understood, Mr. President, as being opposed to anything that is for the real betterment and advancement of dental education or the elevation of the profession which I love so well and have so long striven in an humble way to upbuild, but I would give full credit to all that has been accomplished and is being done and I would open every avenue to those worthy to enter her ranks. Progress is not made by rash and radical changes, but by gradual and rather slow development.

Dr. J. D. Patterson, of Kansas City, Missouri:

The breadth and gravity of this subject demand better ability than I possess, and more thorough preparation than I have been able to give the discussion of the paper. However, I wish to remark that education does not make a dentist any more than long hair makes a poet. Horace Greeley once said, "Of all horned cattle, deliver me from the college graduate." In quoting Greeley, do not understand me as decrying education in any way, neither did Horace Greeley mean that. But he meant what you and I know, that the university graduate, or the medical graduate, usually makes a very poor dentist. The success of any dental practitioner depends upon his early acquirement of manipulative ability, in order that he may serve his patients in the best manner.

I have no objection whatever to the course as outlined by Dr. Carlton, save for the time that it consumes. It does not permit a man to get into actual practice at as early an age as he should.

As to Dr. Carlton's ideal plan, I disagree with Dr. Morgan with reference to his criticisms upon it. I think Dr. Morgan has been too severe. He did not appreciate the fact that when it comes to the dental course it is only a course of two years, not four, which we have now. But even with this almost ideal course of Dr. Carlton's the university is not entered until he is eighteen, nineteen, or twenty. It takes him six years to complete his dental training, and two or three years before he is capable of conducting a practice, to make it self-sustaining, and he is about thirty years of age before he can get married. He ought to be married at twenty-four or twenty-five, and by the time he is thirty years of age he ought to have a family. This cannot be done with Dr. Carlton's course. The nearer twenty years a man gets into the practice of dentistry the better it is for him and his patients. There is no question about that in my mind. There is one thing I have always fought for after the student has graduated from high-school, namely, that he who expects to study dentistry should go into the office of a preceptor before he goes to a dental college, and should have proper training under the private preceptor. The objection to-day is that the student enters a dental college absolutely without knowing anything whatever of what he is going to do, and it takes him two or three months to find out about it. According to the course proposed by Dr. Carlton, they reach an age when they cannot acquire that manipulative ability which is so necessary and which must be acquired at an early age, say before twenty-four or twenty-five, or before the time for entering school, else it is never acquired. At the time he is in the office of a preceptor there is no reason why he should not receive the necessary training, even a university training, but let him commence early, before he leaves high-school. In the manual training high-school he gets that instruction. In the office his fingers are educated to manipulative work, and there is where his after-success in life comes. That is my experience. When graduates from colleges are put into offices and see patients come in they want to run away from them. They do not know what to do with them. If they were under private preceptors they would know how to receive patients, and how to treat them. Furthermore, such men will know whether they are going to make dentists or not, and if not, they will drop out before they reach the dental schools. If a student went into the office of a preceptor for six months or a year before entering a dental school the preceptor would be able to find out whether he was going to make a success or not in dentistry. If he thinks he is not going to make a success, he should be so informed, and the student should then try to find out what his capabilities and inclinations are. But the dental school does not want to be troubled with such a man. We are living in a utilitarian age. Think of what Harvard is doing! Think of what Columbia is doing! Shortening their courses for the Bachelor of Science degree! What are we doing? We are increasing our terms. We have got to come to the march of improvement, and it is along the lines laid down by Sir Michael Foster in his magnificent address at Cambridge. We ought to have a better class of men to whom to teach dentistry, not necessarily men commencing with a university education. We have the high-school, and the manual training school; but let us commence early with manipulative ability, reaching up as rapidly as possible, shortening the training in the professional school.

A good deal was said by the essayist with regard to non-professional studies, such as histology, bacteriology, physiology, physics, chemistry, and even anatomy being taught outside of the professional schools. Aside from dental anatomy, let them receive their education in a non-professional school. There is the place for it, and not in the dental school. They are more capable of giving that instruction in non-professional schools.

Look at the equipment of the laboratories in some of these schools, the endowments behind them, and the possibilities of training young men in them, and compare this with some of the chemical, physiological and bacteriological laboratories which we see in professional schools. You will see how poor is the equipment of the latter. The essayist is right. There is where young men should begin, and when they enter our dental schools they do not need four years. Why not let the student get through quicker, because he wants to get into active practice as soon as possible? Before accepting a student for admission to a dental school, I would try to find out whether there is any possibility of his being a good mechanic. The proudest thing in the world is to have culture, but I would exalt the scientific mechanic. There is nothing so high. Everything about us appeals to us from a mechanical standpoint.

In ninety-nine cases out of a hundred the work of dentistry or of surgery is strictly mechanical; but I do not want a mere mechanician. Certainly not. I want a scientific mechanician. I am in favor of a higher preliminary training than we have yet had. It has got to be along the lines mapped out by Sir Michael Foster and Professor Elliott. They are laying down new lines for professional men, so that they may enter professional schools and get into active business life before they are thirty, say at twenty-four to twenty-five years of age.

Dr. Edmund Noyes, of Chicago:

We have just heard two eloquent pleas for dentistry upon the level of technical skill and scientific knowledge, but not upon the level of a cultured and learned profession. I do not like to hear a man in one breath claim we are a learned and cultured profession and in the next breath contend for an education which does not admit of it.

I quite agree with the ideal of a university training, and the degree of Bachelor of Arts, or Bachelor of Science, as a preliminary to dental education, but this is an ideal which we cannot at present expect to realize, and perhaps we never can. We must have not only a dental education, but a sufficient education in the humanities, if I may call them so, to entitle a man to the foundation elements of culture. And yet fear is always expressed that technical finger skill cannot be obtained if we let boys go through the high-school course. Gentlemen, if you will put boys through the high-school course we have been talking about, which includes manual training, a year or two of training in chemical or biological work, the finger skill they will get in handling apparatus and microscopes in the laboratory is of no mean value. It will answer all necessary purposes, as a foundation for finger training. The perception of accuracy of detail in regard to perfection in mechanical and physical details will be worth more to them than the mere training of fingers.

It has been suggested that the first part of dental education should be taken outside of dental schools, the scientific part of it—anatomy, physiology, chemistry, pathology. I admit that there are important advantages in that, but you all agree with me that by the time a boy is allowed to begin the study of dentistry he should begin the technical training of dentistry, for the reason that in the first two years, when he is being taught medical science, he should have training in the prosthetic and operative technical laboratory. That is the principal reason why he should not get these sciences outside of the dental school.

A plea has been made for preceptorship after the high-school course and before the student begins the study of dentistry. It seems to me a dental school can find out in the first three months, or during the first course, whether a student has any mechanical ability or not, as well as a preceptor could. The place for preceptorship is after he graduates. If he is capable of picking out a good preceptor, so much the better, as he will be able to learn a good deal from him, and will know something about carrying on a dental practice. There are some things in connection with the successful conduct of a dental practice which are learned with difficulty and imperfectly in any dental college. The necessities of the case make that so. Let us take a preceptorship after the student graduates. He learns from a good preceptor how to meet patients, how to treat them, and how to overcome the difficulties of daily practice, thus fitting him for an independent practice after a year or two.

Dr. G. D. Sitherwood, of Bloomington:

I am confident that the high-schools in the United States are giving such teaching, both from a mental, moral and manual training standpoint, that many of the students are capable of entering dental schools much better prepared than formerly. I have talked with Dr. Noyes before with reference to preparation of students in dental offices before entering college. It always reminds me of the old story of the mother who wished her boy to learn to swim before he went into the water.

During the past summer a young man, a graduate of a university, was in my office three months. I will not mention the dental school, but will say it was one of the best in this country. He spent two years in the dental school. He thanked me again and again for many practical things he learned in my office, although mine is no better than thousands of others scattered over this country. If it is possible, I would advocate that a young man go into a dental office, if it is not for more than three months, and find out whether he has the ability that will make a dentist. If not, then let him find out whether he will make a carpenter, preacher, lawyer, or something else.

With reference to a university education, we may come to that, but we are not there yet.

Dr. Truman W. Brophy, of Chicago:

The Odontographic Society of Chicago has been very fortunate, indeed, to have had Professor Carlton make a trip of six thousand miles to present the subject that he has given us today, and we are all glad that it has been presented in the manner it has, and has brought out an animated discussion.

There is an amusing feature to this debate and even to the topic under consideration, for if you will look into the systems, so-called, of the high-schools, the academies, the colleges, and even the universities themselves, you will find there is no system; there is no standard fixed in any of the different institutions that I have named that approaches anything like uniformity throughout this country. The high-school is a Western institution. There are States in the Union which have no high-schools in them. On the other hand, there are high-schools whose course of study really is higher than the courses of some of the colleges which confer the degree of A. B. While we are eager to establish a standard of education for admission to our institutions of dental learning, we are met by this dilemma. In conversation with the principal of one of the leading high-schools of the West only a few weeks ago, I was informed that at a meeting of the High-School Principals' Association they were endeavoring to fix a uniform standard for the high-schools of this country, and up to the present time they have been unable to do so. What, then, do we mean by a high-school education? What do we mean by a college education, which confers the degree of A. B.? It does not mean anything specific, and when we inform ourselves, as the National Association of Faculties will do very soon, as to what a high-school education means, as to what the degree of A. B. means, and as to what other literary degrees mean that are conferred by many of the institutions of our country, then we will be in a better position to make a declaration of what we want and what we mean by a certain so-called standard. We have no means of coming to a conclusion as to what young men should have for admission to professional study. We have no means of determining what the standard should be, except to follow the men who have been engaged, not only in university work, but those who have been engaged, at the same time, in professional school work, and one of the highest authorities living at the present time in the world, who has been engaged in both university training and in professional training, who has expressed an opinion on this subject, is Sir Michael Foster, who presented that admirable address referred to by some gentleman here this afternoon. Sir Michael Foster is the author of Foster's Physiology; he is the Deputy Vice-Chancellor of Cambridge University, a member of the British Parliament, and occupies many honored places in his native land. Sitting by his side, as I had the privilege of doing in 1901, in Trinity College, Cambridge, England, I asked him this question: "Sir Michael, what should the education of the young man be who seeks admission to professional study? Should he go to a university and take his degree of A. B.?" His answer was, "What good will the degree of A. B. do him? No;"

said he, "let the young man pass through what you call a high-school system of training, which includes a good English education; a knowledge of English literature; a knowledge of French and German, and then, having completed that kind of course, let him proceed with his studies in the university, if you please, following chemistry, and following the languages. Two years in the study of physics and chemistry and the languages will fit him for entrance upon the study of medicine or dentistry, and will eminently fit him to prepare for his life-work." (Applause.) There was never a greater fallacy, in my opinion, that possessed the human mind than the idea of literary degrees to prepare a man for professional study. What we need to-day is to learn how to take care of our patients, and the kind of education that will fit a man to take care of his patients, to understand that which they need, and to give them that which they need, in taking care of them, is the kind of education that we want for our dental students. The man who is best able to take care of his patients is the one who will succeed the best.

What should the education be for that preparation? Technique, as has been stated by Dr. Patterson, must be acquired in youth. I might repeat a statement made by one of our Deans in the United States not long since, who received into his school a gentleman of the age of thirty-two. He was able to read and write and speak correctly five languages. He was a gentleman of high culture. He began the study of dentistry, and after four months of most faithful application he was informed that it would be far better for him to select some other occupation. The Dean said that this man had the most thoroughly educated brain, but the most ignorant hand, of any man who ever entered an institution. Hand training calls forth brain training, for no hand can be well trained unless the brain that directs its action can be trained as well. That being the case, hand training and brain training must go together, and what we seek in the preparation of young men to practice dentistry are head training and hand training. They must go together, so as to bring young men up to the highest ideals of professional men.

DR. EDMUND C. FRENCH, of Eau Claire, Wisconsin:

I am interested in dental education. I know what it means to get an education by hard knocks, and, it seems to me, there is a happy medium between the two plans that have been advocated.

I heartily agree with what Dr. Patterson has said, and I want to relate a personal observation. It has been my fortune to have had during my professional life several young men come into my office to study dentistry. I think of two or three now who stayed a year. They entered the dental college, and I have in my correspondence letters from professors where these young men graduated saying that the young men, when they entered the schools, seemed to have had some idea of what they wanted to learn. In fact, their training in the office had advanced them so much that they were fully competent, so far as the mechanical part of their work was concerned, to enter on the second year in college.

Every clinic that has been given at this anniversary meeting has been along mechanical lines, and I venture to say that some of the most useful points or things that have been shown were demonstrated by men who never saw the inside of a literary college, or university. They are naturally born mechanics. You cannot make a singer out of a person who has not a voice. You can teach him all you know, but he cannot sing. If we have the right kind of men, we can make dentists of them.

Dr. J. P. Root, of Kansas City, Kan.:

Apparently Dr. Carlton has not a friend in this discussion, yet every word of his paper is true and right. The successful dentist is not alone the man who can extract a molar. He is the man who can do what is required of him in his office, who can mingle with educated people and discuss something besides molars. I am surprised at a man like Dr. Morgan saying that the successful man is he who piles up dollars and cents. To me the accumulation of money is the least successful part of a man. Dr. Patterson has told you that in order to be successful the student must get out of school as rapidly as possible and go to baby farming. I do not call that a success. [Laughter.]

I believe the successful man in dentistry, or in any profession, is the one who, while he is a success in his own profession, is also a success with the rest of the world; who does not talk shop after he has left his office, and higher education is a necessary qualification for this. That is what Dr. Carlton wants to have you believe. You may get a little too much education, but very few of us do.

Dr. C. R. Taylor, of Streator, Ill.:

I believe our colleges have much to account for when we consider some of the students who come out of them. The dental colleges of today (and I want to say I am a friend of many of the men who are connected with them) are doing just what the lumber men in Michigan are doing, in cutting jagged pines to get good building material out of it. I believe the faculties of the dental colleges of the United States should think more about education and less about the number of students who seek entrance into their colleges. It is easy to get in, whether qualified or not, and just as easy to get out of them. I suppose last year several hundred students were graduated, but how many were plucked along the line? What per cent. of the men who apply for entrance to our dental colleges are refused admittance on account of lack of education? Very few. It is true, we have some of the best men in our profession who belong to these colleges, who are doing great work. And this is a great paper. I hope you will all go home and think it over, and then do as Emerson has said, "Hitch your wagon to a star." We must live on high ideals and not on the real things of life. We must measure success not by dollars and cents, but by what we can do for humanity.

Dr. Carlton (closing the discussion):

I wish to thank you, gentlemen, for the liberal and spirited manner in which you have discussed my paper. I have the courage of my convictions, and if I am a hundred years in advance of the times I am glad of it and should like to live that length of time if for no other reason than to see the ideal consummated.

I regret very much that most of the members in their remarks drifted away from the main point set forth in the paper, in fact overlooked it entirely, and I am indebted to Dr. Root for bringing us back to the subject again. I deprecate the impression that evidently has been conveyed and the reference to the course outlined as "Carlton's course". I did not intend to discuss college courses or precipitate a discussion thereon, and feel now, as I did at the time of writing the paper, that it was a dangerous thing to outline even an ideal curriculum; at the same time I felt that I could not round up my paper or back up my argument without setting some ideal. There has been a good deal of talk about the long years of preparation I would make necessary for entrance to professional life and how old a man would be before commencing active practice if my plan were followed; yet in this ideal course as just set forth, a boy could enter college and get his degree before he was twenty-one, after which he could enter upon his dental studies proper and get through with them when he was about twenty-three, or twenty-four, even younger, and that is time enough; he is still a boy, and usually immature.

In setting forth this ideal I was keenly aware of my own personal deficiencies. I am not a graduate of the academic or scientific department of a university. I commenced the course, but bitterly regret my inability to finish, and have felt the handicap more than once, especially so in listening to Dr. Kirk's scientific paper last night, for I was not able to grasp many of the salient points in it; in fact I am free to confess that much of it was absolutely lost to me. Now, if I had received a university training in the sciences, was well versed in chemistry and had had a good laboratory training the paper would have done me much good.

I shall not detain you any further, except to repeat my main thought, that if we wish to become a cultured and intellectual profession our ideals must be high, our preparation thorough. I firmly believe the profession of the future must be made up of men who have received a broad mental training or they cannot grasp what will be given to them in the next five, fifteen or twenty years.

THE ODONTOGRAPHIC SOCIETY OF CHICAGO.

A regular meeting was held Nov. 17, 1902, with the President, Dr. C. N. Johnson, in the Chair.

Dr. Hart J. Goslee read a paper entitled "Taking the Bite."

DR. L. P. HASKELL:

I have been very much interested in the paper just read, and I agree in the main with the sentiments advanced by its author. This old question as to how to get a correct bite is still an unsettled one —it is with me, at least. Some dentists have professed to settle it, but so far as I am concerned I have not been able to do so. I have tried the various devices that have been advocated from time to time, and I find that there are none of them that are reliable in all cases. Well, what is the dentist to do? I would simply say, as was indicated by the paper, if it is a case of rubber plates, I use wax base-plates, putting a piece of iron wire in the lower one, so that it shall not get out of place in trying in the mouth. I arrange the rim of wax on the lower plate first. Having done that, arrange the upper ridge of wax. Never say to a patient, "Close your jaws naturally." Just as sure as you do, they will do it unnaturally. I say to them, "Close your jaw." Don't give them time to think about it; a quick closure is most reliable. Removing it, do some trimming, and replace it. Placing in the articulator, proceed to arrange the teeth. I believe Dr. Ottolengui does not approve of trying a set of teeth in the mouth. I always do, as it is impossible for me to tell how a set of teeth is going to look except as seen in the mouth. I arrange the upper teeth first, getting these as near right as I can, then arranging the lower ones to them. With the lower teeth, always arrange the posterior teeth first, beginning with the second bicuspid, because it is of the utmost importance to secure the proper occlusion of the posterior teeth. I think most dentists arrange the anterior teeth before they do the posterior ones. Oftentimes the anterior teeth are too wide, and if they are arranged first it is impossible to secure correct occlusion by the interlocking of the cusps. I have seen them grind the cusps end to end instead of articulating them. Then in arranging the anterior teeth lap if necessary or narrow them.

There is another reason why it is better to arrange the teeth by the mouth. I want the patients to see them, so if they desire changes it is then readily done. It is a difficult matter to swallow without closing the jaws tight, and the jaw closes as far back as it can be carried. Try it yourself, place the jaw forward, say even the thirty-second of an inch, and try to swallow, and see how difficult it is. I have often applied that rule in securing the bite, yet do not always find it succeeds. I spend much time in arranging teeth, considering it a matter of too much importance to slight.

I recently had a peculiar case which was quite the reverse of that, and I had a case once before where closure was exact every time, as in the articulator. After the work was finished, and put in the mouth, the patient closed the jaw farther forward than the articulator indicated, and could not close any farther back. I have tried to find some reason for it, but I have been unable to do so. If any of you gentlemen have had a similar experience and can explain it I would like to have you do so. I am not too old to learn; I get new ideas from the younger men, and I am not only glad to get them but to acknowledge them.

Dr. W. H. Taggart:

It is quite the proper thing to compliment the essayist, and I would do so this time by saying that his paper is a very interesting and comprehensive one. There are some points in which I would differ from him, and also from Dr. Haskell. I believe in taking the patient more into our confidence, having him help us to take the bite. I never had good success in taking the bite in an edentulous mouth until I began to use ideal base-plate wax, making an accurate fit to an accurate model, building the wax up, and getting articulation, as Dr. Goslee has suggested, with the supplementary suggestion of sprinkling the upper and lower parts of the ideal baseplate with gum tragacanth. In an edentulous mouth, with the tendency for the plate to slip around, you see how much easier it would be to close the jaws always in the same direction, if those plates were immovable, the same as a good fitting plate would be in the mouth, and this gum tragacanth sprinkled on the part in contact with the mucous membrane will make the bite twice as firm and more easily handled by the patient. This question of taking the bite is largely one of education. I say to the patient, every time you lose a tooth or teeth you have to accustom yourself to a new position, so that you get out of the way of taking a natural bite. I will go on into my laboratory, and leave you with a hand-mirror to look at yourself. Look as nice and as natural as you can in taking the bite, or as ridiculous as you can, and keep on biting just as if you had a well-fitting set of teeth in the mouth. When I return in five or ten minutes I generally find the patient has become educated as to the importance of taking the bite correctly. As a rule, these patients get themselves into a comfortable position, and when they reach a stage in life that they need a full upper set of teeth one of the first requisites is to make them comfortable. You will never make these people look pretty unless you get that one feature, comfort. Educating them in this way is one of the greatest steps in advance I have ever made or undertaken in making an edentulous jaw satisfactory.

Dr. L. P. Haskell:

The suggestion of Dr. Taggart is a very happy one. I never thought of it. I shall try it—I mean with reference to the application of gum tragacanth and in trying to educate the patient.

Dr. Taggart:

It takes but a few minutes if the patient's attention is centered on one thing, and he becomes educated very rapidly.

Dr. Haskell:

The most difficult cases are those where the patients have been not without teeth, but often wearing artificial teeth, which are so often too short. Many dentists are in the habit of putting in teeth altogether too short, so that it is difficult for the patient to use them. I seldom see patients with teeth too long, but in a large proportion of the people I meet wearing artificial teeth the teeth are too short, and the jaw is thrown farther forward than it would be naturally. If a person wears these short teeth for a number of years, and then substitutes a new set, with the jaws apart, it is a difficult or awkward thing for the patient to undertake to close the jaws, and in closing the jaws they run against a snag, so to speak, so that it takes time for them to become accustomed to the new condition of things.

Dr. W. H. Taggart:

I do not like to digress from the question of taking the bite, but my experience in making artificial dentures has led me to this belief: I would not allow the best dentist in the world to take out my last lower tooth, if I were going to wear a lower plate, unless it was wabbling. If there was a tooth in the mouth that had a permanent attachment to the jaw I would save it and anchor to it. You know that you can hold a fractious horse with a piece of string tied to a post. This will steady him. The same thing applies to anchoring a plate in the lower jaw. When it is anchored a patient will not play with it, because it is not annoying. On the other hand, if you do not anchor it, the patient will invariably keep fussing with it.

Dr. E. J. Perry:

Dr. Goslee expected his paper to be only a part of a symposium, and it is unfortunate that we have not had the rest of the papers this evening, so that we might be able to consider them as a whole.

It is impossible to consider the importance of the occluding bite or the details of taking the occluding bite without considering the subjects of articulation and occlusion. What is an occluding bite? The object of the occluding bite is to transfer to the laboratory the mouth of the patient; that is, when we are arranging the teeth in the laboratory, in effect we are arranging the teeth in the mouth. Therefore we must arrange them on an articulator that mimics the movements of the lower jaw. The occluding bite plate must be a hard substance that will not change with the temperature of the mouth, and the only thing I have found worthy of making such plates is the ideal base-plate. You can file it and smooth it as nicely and as neatly as a rubber plate. I never tried the experiment of using gum tragacanth on the plate, but I have made ideal occluding base-plates that drew up to the mouth as tightly as a rubber plate did, and that eliminates one of the great difficulties in taking the bite. The patient is not concerned in the retention of these plates, or is not worried with them moving about in the mouth, and they are more liable, therefore, to give correct closure of the mouth.

Another reason why I want the occluding bite on ideal base-plate is that I can determine the position, the length, etc., of the front teeth by the wax, and also the amount of restoration that is necessary. I can determine the position of the lower incisors, and that will give me the equilateral triangle, and I can place it on the anatomical articulator correctly. The sooner you take up the articulation and occlusion of teeth upon the principles laid down by Dr. Bonwill the less trouble you will have.

Dr. A. N. Davis:

In regard to taking the bite, I believe it can be done properly with wax base plates, instead of ideal base plate material or wax which is wired. Make upon the model a base plate of pink paraffin wax, and upon this, following the ridge, a rope of wax for the bite. Place in the mouth and trim the wax to the length desired for the teeth and the fullness of the lips. If the bite is one for a full upper and lower case, the jaws should be closed easily to ascertain if the occluding surfaces of the bite plates strike uniformly. If such is found to be the case they should be removed from the mouth and placed in ice water, so that the wax shall become hard, preventing them from sticking together when securing the relation of the lower jaw to the upper. The method I have found of much service is to have the patient thrust the lower jaw forward and then walk away from him. The muscles will become tired, being in this strained position, and the jaw will slide back unconsciously into a position of rest. Returning to the patient, the wax plates may then be sealed together. Instead of pulling them out of the mouth with the fingers, which might change their shape, instruct the patient to push them out with the tongue; he can easily do it, and the operator may grasp them as they fall out of the mouth without danger of changing their shape.

Dr. W. H. Taggart:

In arranging the teeth I use the same base-plate for the piece on which to arrange the teeth to try in the mouth. I invariably try teeth in the mouth. In doing this, when you use ordinary wax preparations for attaching teeth, after trying them in the mouth for a time or two, moisture will soak in back of them. Anything that has paraffin in it will not; being adhesive, it will keep moisture from the back of the teeth. I take each tooth and warm it in the flame and put a cold stick of wax against it until it melts, smearing the surface to be attached to the wax. When you carry it to the plate with the stick wax attached to it, warming it sufficiently so that it will mash into it, you have attachment of the teeth to the base-plate, so that the moisture does not penetrate. Having gotten the arrangement of the teeth to suit me, I begin to educate the patient again. I say to him, a man does not have to be a tailor in order to know how his clothes fit or how they look. He may be a better judge of how his clothes look and fit than the tailor himself. He may suggest to the tailor that a little more padding on the shoulders would look better, or a higher collar would look better. I apply the same principle in educating them as I would to my tailor, and I say to them, that is what I want you to do in getting satisfaction with these teeth. I will smooth the wax out, I will let you take the teeth home with you, and in your quieter moments, when not thinking about the office, I want you to put them in the mouth, look at yourself, wear them every once in a while, take them out, dip them in cold water, or take a drink of ice water to keep the wax hard, and keep the teeth in position. Let him come back to-morrow or next day, after having worn them several hours in the meantime, and frequently he will be able to suggest changes to me that are really helpful.

Dr. T. E. Powell:

There was one statement made by the essayist which I do not think ought to go unchallenged. The paper, as a whole, was satisfactory, but one suggestion, in my opinion, is wrong, and that is this: He made the statement that where the teeth had been out for some time the patient, in attempting to draw the jaws together, would push the mandible forward. We all know, those of us who have taken bites for any length of time, that invariably the mandible bites forward of the upper jaw, and in an effort to bring these two jaws together, instead of the lower jaw or mandible being pushed forward it will invariably have pulled back. That is a point that we should not allow to go unchallenged in a body of scientific men like this.

Dr. Goslee (closing the discussion):

I did not hear all of the discussion, because of being called out of the room. From what I gleaned, Dr. Perry has said that it is best to use Ideal base-plate material for base plates. Successful results with this material are possible beyond a question of doubt because of its stiffness, but it also possesses the disadvantage that this stiffness makes it brittle. A base-plate of wax can be made as useful, however, as one of the Ideal material, because that part of it which covers the ridge, and which is likely to be distorted upon removing it from and replacing it in the mouth, is re-enforced with the necessary rim of wax. The requirement in this connection is simply that we must use base plates that may be easily moulded to, and which will retain the shape of the mouth while being inserted and removed.

Dr. Powell has made an assertion to the effect that he could not allow the philosophy that I have given to go unchallenged. I in turn cannot allow the statement made by him to go unchallenged, because he says that anybody who has taken bites for a considerable length of time will note that the mandible or lower jaw is always forward of the upper. It is true, Dr. Powell, without doubt, that oftentimes the mandible is more prominent than the upper jaw when in its normal occluding relation, but it is also possible to protrude it still farther beyond the upper, and it is this tendency to bring it forward that I endeavored to illustrate, and which I said we must overcome by avoiding resistance or applying it first to the posterior region. The probable cause of this prominence of the lower jaw in its relation to the upper is due to the fact that the upper teeth are usually lost first, and the lower incisors last, and in these cases, where the original occlusion was normal, we often find the lower jaw more prominent than the upper. The plea I made was that we must endeavor to overcome the tendency toward protrusion by not offering any resistance to the anterior part of the mouth, and the philosophy I gave was simply to show that we should make no effort to have the patient bite or close the jaws on anything that offers resistance, but restore the ridges with wax and have the jaws come together without effort. The class of cases mentioned by Dr. Powell are not typical, but the exception rather than the rule.

Dr. Davis made a very good suggestion, but I have not tried it, because of not having found the necessity of it. I believe that if one takes enough time in taking the bite he can usually get a correct occlusion by having the movements of the mandible under perfect control. Instructions to the patient to "bite" into anything is what usually induces the incisal relation, even after we may have the jaw under our perfect control. The patients are likely to do what we tell them to do, and if they have no knowledge of what we want and we have nothing to offer resistance, it is usually an easy matter to get a normal occluding relation of the lower jaw to the upper.

ODONTOLOGICAL SOCIETY OF CHICAGO.

Regular meeting of the society Tuesday evening, December 17, 1902, the president, Dr. E. J. Perry, in the chair.

Dr. E. A. Royce read a paper entitled, "Antiseptic Fillings," which was discussed as follows:

Dr. J. H. Woolley:

I have thought a good deal along these lines. When a tooth is in that condition of decay he refers to I find in the preparation of the cavity that the dentine covers the pulp thinly. I place in the cavity a pulp capping as a non-conductor and fill temporarily, and in the course of time, if no trouble occurs, I remove the temporary filling and and fill permanently.

As regards root filling, in the first place the canal and dental tubules must be rendered thoroughly aseptic. Heat is an important factor in this process, and when used by means of a heated broach will thoroughly desiccate the canals and tubules. Then place in the canal an antiseptic dressing, which will be absorbed into the dental tubules by capillary attraction. Again apply the heated broach or any absorbent, and then insert into the pulp canal your gutta-percha filling, which will seal the medicament in the tubules so there will be no danger of micro-örganisms finding a habitat there.

Dr. L. L. Davis:

This seems to me a presentation of an old subject under a new form. Not that I think that it is out of place, because it is a thing that we should emphasize all the time, to have absolute cleanliness and all the antiseptic precautions necessary to carry out the work, but it seems to me, that aside from the fact of hydro-napthol being used as a medicament, that I have been doing just this kind of thing for the last fifteen or eighteen years. I never fill a root unless I have the canal antiseptic before I insert the gutta-percha, and I do not use, as my preceptor did, old gutta-percha fillings dissolved in chloroform for my root fillings. As to the capping of the pulps the only way I try to cap a pulp is to put a dressing of iodoform over it. There is a preparation that is composed of iodine and cement and has no particular odor. I always lay a layer of that over the leathery substance and flow over it the ordinary cement and fill. Pulps may die occasionally. I don't cap very many, and what few I have capped I don't know that I have seen one case back in the last ten or twelve years.

Dr. A. W. Harlan:

I take it that the presentation of this paper of Dr. Royce is intended to be serious and that it is intended for the use of the members of the society and of the dental world. The history of the antiseptic treatment of disease, the antiseptic method of filling root-canals, etc., is familiar to you all. Many manufacturers have gotten out cements and preparations that were intended to cover the point that Dr. Royce has made. One of them is a cement which is composed of iodine and formic acid, or formalin, and in England, particularly, the method of incorporating substances with cement powders is not new, as Dr. Royce stated in his paper. I presume in a limited way all of the dentists around the table have used various methods of securing what they call antiseptic fillings, but if you are going to use any of the napthol series for filling I should think it would be better to use beta-napthol, which has no odor and is much more potent than hydro-napthol.

I have nothing to say about the paper except that it is in the right direction. I think probably the bacteriological aspect of the case is quite correctly stated. The reason why a great many pulps die after fillings have been put in is because a particular form of micro-organism that tears down the dentine and its spore is usually not destroyed by disinfectants, and so you have later an exposure of the pulp under the filling and the pulp dies. Many a man has been surprised five or six years after putting in a filling that was some little distance from the pulp to find that the pulp has died. The incorporation of substances in root fillings that are not soluble in water I think is to be commended. I am opposed to any substance used in the root that is permeable to moisture or that would cause a washing out or a lessening of the so-called disinfecting properties of the substance. One of the reasons for the failure of a great many root fillings is because they are soluble in water. The root of a tooth is surrounded by moisture, and ultimately if these bodies are surrounded by it for a long period they are usually dissipated, and hence we would find the odor. Now if the gutta-percha that enters into that root filling does not contain too much foreign matter it is not permeable by moisture. Anyone who wants to read about the history of the laying of cables and their resistance to salts and to moisture and to gases will inform themselves about the permeability of gutta-percha. If you have too much oxide of zinc, if you have too much beta- or hydro-napthol, or any other substance that is soluble in water, that is a weakness.

Dr. Elgin MaWhinney:

I want to express my very great pleasure in having the privilege of dining with you and being at this meeting.

It has been my teaching for years that I had rather expose the pulp of a tooth than to leave it covered with leathery decay, for two reasons: First, it is almost impossible to disinfect it. I know you can take the leathery decay out and disinfect it, but it takes a great deal longer than many of you think. There are only two or three agents that will disinfect any considerable mass of leathery decay inside of an hour. The second and greatest reason is not so much the living organism that you may leave there or its spore, but the baneful influence of its ptomaines and its leucomaines. These poisonous products of bacterial action are the things that destroy pulps very often. I have experimented enough to know something about that. So Dr. Royce in his paper is not referring to covering up leathery decay. He referred to leaving that portion of dentine which is not disintegrated, but into which the baneful influence of bacterial action has gone; hard dentine, so to speak, that is, discolored, perhaps, or been affected slightly. As he stated, micro-örganisms or their products may have gone into the tubuli, and it is for the purpose of destroying these that he suggested the use of this permanent antiseptic. The remarks of Dr. Harlan in regard to the insolubility of any antiseptic that is used in connection with this subject are very important. Dr. Harlan has spoken of that so many times, and I realize that more and more the longer I practice and the more experimenting I do. I have had no experience whatever with hydro-napthol, as suggested by the essayist. I have used iodoform in connection with the cement powder and then making the paste, but more particularly have I used iodoform without the phosphoric acid, making a paste of pure oil of cloves, in which I have mixed oxide of zinc and the iodoform. I know all of you object to the odor of iodoform, but I have never been able to find anything that will accomplish the same result. In a case like this, for instance: A child presents at the age of eight with the first permanent molar pulp nearly exposed. We all know that in the ordinary child at that age the root canal of that molar is not very well formed, the foramen is large and the filling of the root would leave the tooth in a poor condition. I think that it is desirable to save pulps in children's teeth, and so I have been using the iodoform in the manner mentioned, pressing it down in such a way as to exclude the air. I can see some advantages in the method that Dr. Royce suggests, one of which is the fact that it is often difficult in proximal cavites to get distance enough between the pulpal wall and the orifice of the cavity to give room for much of a capping, and consequently it is necessary that that capping be resistant, something that will not mallet down. In talking with Dr. Royce privately on this matter I find that he lines a great many cavities with this kind of cement where he does not think there is danger to the pulp, but where for any reason the tooth is weakened. I believe that is good practice.

Regarding the root filling: The more roots I cut into the more I find those that do not smell good. We have not yet the perfect root filling. In a large root-canal that is comparatively straight I always use gutta-percha alone. And I think this idea of flooding cavities with eucalyptol is nonsense. I believe that the space is going to be occupied by something sometime and it will not be eucalyptol. If you fill the tubuli with any of the antiseptics, particularly the essential oils, how long are they going to say there? Just long enough to discolor the whole tooth. These tubuli in a great many teeth have anastomosing branches that go out to the peridental membrane, and the majority of root fillings, when chloroform is used to dissolve the gutta-percha, are porous and permeable through the apical end. When the chloroform is gone the root is not filled perfectly. If eucalyptol is used it is worse in that particular.

I think that Dr. Royce is making a good suggestion, and that is, incorporating into the solid gutta-percha an antiseptic which is practically insoluble. In talking with him a good while ago on this subject I found that he has had occasion to take out root fillings, or to cut into them, that have been in eight years, and finds distinctly the one odor, that of hydro-napthol. That is an improvement over what I have been able to find. I think the essayist is to be congratulated because it is a step in the right direction.

I am delighted to know from Dr. Royce that many pulps that he has capped that were actually exposed have been alive after six or seven years.

DR. FRANK L. SMITH, of Denver:

It certainly gives me great pleasure to have the opportunity of visiting you this evening and listening to Dr. Royce's paper and the discussion, and am glad to see the advancement that is being made in these new things. I thank you for the courtesy which you have extended.

DR. TINKHAM:

Dr. Royce's interesting paper brings to my mind a rather strong statement I made to Dr. Carpenter a few weeks ago in regard to my success in the use of hydro-napthol, incorporated with oxchloride of zinc as a root-canal filling. I have used exclusively this combination as a canal filling since I graduated—it was recommended by Dr. Truman, and, I believe, by Dr. Darby also.

I made the statement to Dr. Carpenter, and I reiterate it tonight, that I do not know of a single instance in my practice in which the use of this combination has been the source of a failure.

I had an occasion last week to open a canal that had been filled a little over eighteen years with gutta-percha. It had a faint odor of oil of cinnamon and was sweet and clean, so I think that they both have their merits.

I do not know whether my success is due to the agents I use or because I take the greatest possible care in preparing the root and getting it in a thoroughly antiseptic condition. The material is carried into the canal on fibres of wool cotton. In the eleven years of its use I have formed a friendship for it akin to the man of one idea. I thank you, gentlemen.

DR. FRANK H. GARDINER:

I have often thought that the man who advocated a chloro-percha root filling would give in sometime. When you compare a root filled with gutta-percha to a cable going across the ocean they are two different things.

DR. C. S. CASE:

In attending societies, especially of late years, I have been impressed with the idea that there seems to be nothing so very new under the sun. We seem to be working along about the same lines with slight variations—of course, important variations—that were practiced years ago. During the reading of Dr. Royce's paper I remembered a meeting that took place in Jackson, Mich., during the '70s, that was attended by Dr. Corydon Palmer. This was in the early days of oxychloride of zinc fillings. At that meeting he showed on a slab of glass how he mixed the powder and fluid with wood creosote for a filling. This he used for the capping of exposed pulps and for the filling of deep cavities. And so for a great many years in my practice I used a mixture of oxychloride of zinc, and later oxyphosphate of zinc, mixing it with wood creosote and finally eugenol, for covering the deeper portions of the cavity when I anticipated filling with gold and amalgam. The filling of canals, it seems to me, does not depend so much upon the material as upon the man behind the material. It reminds me of a story of an old darkey who came along with a lot of ducks on his back and an old muzzle-loading gun, and one of these modern hunters with his hammerless gun, met him and said: "Well, Uncle Billy, I suppose you shot them all on the wing?" "Oh, yes, sar," he said. "I shot 'em on de wing, I shot 'em on de head, I shot 'em on de tail, I shot 'em anywhere to get 'em." He then said: "I don't see how you could get so many ducks with that old gun." "Well, sar," he replied, "hit's my opinion it ain't de gun, but it's the man behind the gun." It is a good deal the same in filling teeth, and especially in filling root-canals. It was my method for many years when I was in practice to resort to special means to get the canal into a perfectly aseptic condition and to be especially careful not to force some of the decomposing material through the apical foramen, and after that to see that it was thoroughly dry. Then for a number of years I used gutta-percha, dipping the point in oil of cajuput, which I believed was a very good thing. We find today a new remedy, no doubt a very good one, and possibly a great deal better, but, after all, it is the man behind the instrument that does the work. I think Dr. Royce's paper, as his papers always are, was a very good one indeed.

Dr. J. G. Reid:

I shall not speak about disinfecting dentine, but confine my remarks to pulp canal fillings. I have put all sorts of things into canals and have come to the conclusion that the reason we have odors from pulp canals is because they are not hermetically sealed. I do not think it is necessary for Dr. Royce to incorporate anything in a properly filled root, though it may be a good thing in one that is not well filled. We will continue to have these odors unless we get something better to fill pulp canals with than we have today.

Dr. Elliot R. Carpenter:

There is only one phase of the paper that I wish to speak on, and that is in connection with incorporating into cement powder some kind of an antiseptic. As has been remarked by Dr. Harlan there have been a good many cases with fillings that were not very close to the pulp and where the pulp had died, not due to thermal changes, but to the presence of micro-organisms remaining in the dentine. And I believe from my own short experience, and from the longer experience of Dr. Royce, that a mild and constant antiseptic of some kind mixed with the cement will obviate the death of pulps in those cases. It is my custom, and has been for ten or twelve years, to line the bottoms of all deep cavities, whether they are encroaching close upon the pulp or not, and I always incorporate into that lining, or I have since talking to Dr. Royce about four years ago, hydro-napthol. I think possibly that Dr. Harlan's suggestion of odorless and colorless beta-napthol is an improvement over the old. I think that the paper has given us some very good points for reflection in the future.

Dr. J. H. Hinkins:

I will say frankly that I take very little stock in antiseptic fillings, but prefer, if possible, to get down to good healthy dentine and thoroughly dry the cavity and fill it. I do not believe that we have any antiseptic filling today that we can put in teeth that will act chemically or that will act as a disinfectant to any degree of certainty. There is nothing that we can put into a tooth that will produce an insoluble substance in the tooth but what will destroy the pulp. In filling root-canals, if I can get the canal thoroughly dry I am not very particular whether I put in oxychloride of zinc or gutta-percha. There was one thing spoken of, and that was the death of pulps due to phosphoric acid or anything of that kind. It is a fact well known in chemistry that the stiffer you work cements the more oxide of zinc you will get, the thinner you work them the more phosphoric acid you get, and within the last year Professors Fischer and Wolf of Germany have shown that when arsenic and phosphorus are brought in contact the phosphorus has the power of acting on the arsenic, increasing the action nearly fifty per cent, and that is one reason why I am a stickler for chemically pure cements. That is why German cements, as a rule, stand the best. I agree with Dr. Reid in what he said.

Dr. J. G. Reid:

When the essayist closes the discussion I would ask him to answer for my own satisfaction on what theory he bases the action of hydro-napthol, its diffusibility, how it becomes diffusible, why it is diffusible, mixed, as has been shown and demonstrated by the materials presented?

Dr. J. E. Hinkins:

I would like also for the essayist to give us his opinion as to whether or not the hydro-napthol has anything to do with the solubility or insolubility of cement when incorporated as he suggests.

Dr. W. V-B. Ames:

There is not much left to be said. I do wish to express a hope that the time will come when there will be fewer instances of this talking about red gutta-percha and white gutta-percha and such meaningless terms. I want to take exception to such expressions as white and pink and red and base plate. If we should say high or low heat or 150—180—200° Fahrenheit gutta-percha, it would convey more meaning.

I have a good deal of faith in hydro-napthol. From what I have heard people say of it and from taking the manufacturer's and others' word for it that it is soluble in one part in 1,100, being efficient in that dilution, it would necessarily be about as good a thing as we could use to incorporate with gutta-percha, and for that reason I have, in opening up the sulci in a permanent molar of a young child incorporated hydro-napthol with gutta-percha, expecting good results, and I must say that I have had them. I have not used it mixed with cement so much as Dr. Royce has. To have germicidal results from any material it must either be soluble, so as to have its potency direct, or give off a potent gas, or we must have a material so acted upon by moisture or the serum that a germicide is developed. It seems to me that the ideal germicidal filling would be one which would be very slightly acted upon by the fluids. If the fluids are present we get the action; if they are not it is simply an inert material.

Dr. E. J. Perry:

I do not believe that there is any permanent antiseptic filling. If there is any animal substance in that root-canal, any portion of the pulp left there, it is going to give trouble if you leave it and cover it up, it does not make any difference with what. In latter years I have been getting more animal substance out of pulp canals than I ever did before, simply because I put more time on it. I use the Kerr broach. I filled a root with cotton in 1871, and many years after the tooth was extracted and split open, and the cotton was found perfectly sweet, dry and clean. That does not prove anything except that I had by some means sealed the apex of the root.

Dr. Royce (closing discussion):

First, I will say that the claim is that hydro-napthol has about twice the antiseptic power of beta-napthol, and I do not know that the color makes any particular difference. My observation about the dissolving qualities of cement are about the same as other operators. As I want wearing qualities I reduce the quantity of hydro-napthol. I have a theory of my own about root-canal filling. I do not disagree with Dr. Reid in regard to the cleansing of root canals. The first thing I have a theory about is Dr. Perry's sweet cotton, and that proved that the walls of that root were solid and that the tubuli were nearly closed and that there was no direct opening through from the pericementum to the pulp canal. That is what it proved to me. You will notice I stated distinctly that my idea in the use of hydronaphthol was simply as an adjunct to our usual antiseptic treatment, and my experience with root-canals, both of my own handling and those of others, has been that I got an odor from gutta-percha, and I do not believe that gutta-percha with an aseptic condition would give me a septic odor. I think if I can keep my fillings absolutely aseptic, or even antiseptic, I have gained one point toward making my root-canals aseptic, not that I expect to mummify organic matter that is left in the pulp-chamber. And if you will remember, I did not advocate leaving any leathery dentine over the pulp. I did not advocate careless cleansing of pulp canals. In other words, I did not give a chance in that paper for any lazy man to be more lazy. I have said a good many times that dentistry was a very poor place for a lazy man. But I do believe that when I have done my best to prepare a deep cavity that I have bacterial ptomaines and so on in the dentine ahead of where I want to clear a good many times, and I believe that if I put a material in there as a filling which will not become septic, even if the surrounding conditions are septic, that I have obtained a very potent factor in producing an antiseptic condition in that cavity. If Dr. Ames has a filling or can obtain a filling from which he can get an absolute germicide in contra-distinction to antiseptic, and not lose the substance of his filling, he is one ahead. But if I obtained a germicide which would act forcibly as a germicide on the surrounding dentine, either in a pulp canal or in a cavity, I should expect to lose the substance of the filling quite rapidly. I agree with Dr. Perry. I have had a great many experiences which have taught me that a cement of hydronaphthol as high as one part to two or even five is tolerated by pulps in a way that no other filling that I have ever found will be tolerated, and it can be put in place with less care than some of the others that have been mentioned. I did not bring this subject up as anything particularly new. My own part of the paper is distinctly stated, in setting crowns or incorporating it with gutta-percha for root-canal fillings. The subject has been very thoroughly discussed and I am glad we have been able to learn something from the discussion.

THE TENTH ANNUAL MEETING OF THE INSTITUTE OF DENTAL PEDAGOGICS, DECEMBER 29, 30, 31, 1902.

HELD AT THE PALMER HOUSE, CHICAGO.

DISCUSSION ON PRESIDENT'S ADDRESS.

Dr. N. S. Hoff, Ann Arbor, Michigan:

Mr. President, it gives me great pleasure to commend the very admirable and suggestive address to which we have just listened.

I am particularly pleased because Dr. Goslee selected as his theme the ever-interesting subject of the curriculum. This selection is especially fortunate in view of the fact that the committee which was to have made a report at this time upon the character of the curriculum for the four-year course is unable to make that report. An opportunity is afforded us to discuss this important matter by taking up the various points considered by our President. As a member of the committee appointed by the National Dental Faculties Association to prepare a four years' curriculum, I prepared one which I thought might at least serve for the purpose of eliciting discussion; but when the committee had its preliminary meeting at Niagara Falls, last summer, it was decided that it was not an opportune time to enter into a discussion of that subject. The committee concluded that it would simply hand in a report of the curriculum committee and allow it to be printed in the transactions, to lie over for a year so that the members of the association might have sufficient time to think the matter over.

I have been cherishing the hope that your committee on curriculum would bring this subject up for discussion at this meeting, because I am convinced that in this body we can more deliberately discuss this subject than would be possible in the National Dental Faculties Association. Here we have less of outside interest. I trust we may be allowed to discuss it fully in connection with the President's address. Before another meeting of the National Faculties Association is held the announcement of the four years' course must be published by every dental college in the country, and that announcement should contain a four years' curriculum.

The suggestion made by the President of the desirability of a uniform curriculum for all the schools must appeal to us as a timely one. It declares the object to which we have aspired in the discussions of this body for the last ten years. We have been working toward it, yet we have not been able, either theoretically or practically, to come to any definite conclusion. But our minds are gradually centering toward uniform methods of instruction. This has come to be so not because we wanted it, but because by exchange of ideas each one has been compelled to modify the consideration of his special subject. Each teacher has seen in the methods of another things which he could adopt with benefit.

I do not think that it will ever be possible for us to dogmatize on this subject. We may gradually drift into a practically uniform curriculum because of this interchange of ideas which occurs in these meetings, but there are many difficulties to meet. Every school has its own environments and peculiar features, something which we cannot possibly control as a body, because each school must solve that problem for itself. Hence I do not expect that we will ever arrive at an absolutely uniform course of study for our dental schools.

But we may well let that take care of itself. So long as we continue to come together year after year to discuss subjects I have not the slightest doubt that our curriculum will in due time be sufficiently uniform for all needed purposes.

The most important question at this time in connection with this subject is the consideration of what shall be done with the added year of instruction which goes into effect this fall. What shall this instruction be? I am not prepared to answer that for anyone else, but I have my own views about it. Through the influence of this association and other instrumentalities, to which I have already referred, we are progressing along the lines of technical development in a way that is entirely satisfactory. That department of our work should be disturbed as little as possible. The first three years should remain practically as they are now. They should contain practically the same subjects, taken up in practically the same order and to the same extent. In this way we will gradually work into the four years' course in the easiest possible way and without disturbing existing conditions, and there will be less occasion for making mistakes. If we attempt to reorganize our whole system of instruction and adopt some ideal scheme based on four years of instruction, tearing to pieces our present curriculum, I fear that the results may be very unsatisfactory. I think that in the first three years of our present curriculum it is possible to develop the technical aspect of the subject sufficiently for all practical purposes. But it seems to me that we should make a more general advance. There is a great deal said about our being a profession, but we are often compared with others to our disadvantage. We are called techniquers and mechanics and we have no broader outlook than any other mechanic in a high grade department. That is, of course, mere talk with which we cannot have any sympathy, because it is not founded on truth. But there is apparently some reason for it because of the fact that the large majority of the members of the dental profession today are men who have not gone much farther than the technical departments.

Occasionally you will find a man who branches out into literature or other subjects and makes a name for himself. We have a few specialists, a few scientists, a few Blacks and Millers, who have gone on in advance of their profession, but the rank and file have not advanced very much. It seems to me that the reason in large part has been that we have not in our system of education taken cognizance of the principles that are necessary to develop that sort of men. The students do not have any opportunity to think for themselves. Their time has been occupied with technique and their minds filled so full of the practical side of their work that they could not take advantage of the opportunities which presented for the development of the scientific side and of a broader culture.

In this fourth year of our course we ought to take up the scientific subjects and study them in such a way as to develop men who are able to initiate for themselves work of a scientific character. Preferably it ought to be in the line of such subjects as pertain to dentistry. How many men are there in the dental profession today who have any fundamental knowledge of the subject of physics? We must confess that we know very little about it. There is hardly a man practicing dentistry in Chicago but who is making more or less use of electricity, but when his machine gets out of order he must send for an electrician. He cannot put in a fuse, nor make other necessary repairs to his engine. He knows little or nothing about the management of that wonderful agent. The whole subject of cataphoresis has gone out of existence because we did not know how to use it. The subject of radiography is also one that is beginning to come into notice, and as dentists we have greater opportunities for developing the practical application of electricity than any other profession. There is hardly a dentist anywhere who is not using electricity in some form or other. Among physicians you will find one here and there using electricity, but they are few when compared with the number of dentists using it. And why should we not know all about it? That is one subject which we might add to our four-year course. There is enough in it to take up the time of the whole year.

Another subject is the introduction into this fourth year of original research work. Is it not possible for us to lay the foundation so broadly that in the future, instead of having only one or two men in the country doing this work, we may have many of them?

In this way our profession will make the advance that is demanded of it in order that it may be recognized as a profession by everybody.

There is, then, no question but that there is an abundance of new material which may be utilized in the fourth year without disturbing the present curriculum in the least.

Dr. S. H. Guilford, Philadelphia, Pa.:

I did not have the pleasure of hearing the whole of the President's address, and therefore what I have to say will be more on what Dr. Hoff has said. I have two thoughts to present. One with reference to the four years' course. He gave it as his opinion that the college course as it exists at the present time should be the course which is followed in the four-year course, and that the fourth year should be devoted largely to practical work. That would be very well were it not for the fact that most of the final examinations come at the close of the fourth year; and also because of the fact that the state board of examiners insist on examining all the students on all the subjects at the close of their college work.

Now, if a student is examined at the end of the fourth year on work that he completed in his third year he will hardly be prepared to stand an examination at the end of his college course. For this reason I do not believe that Dr. Hoff's idea is a practical one.

There is another solution of that question, however, one that struck me rather forcibly. Many of you no doubt know that in the State of New York the medical examining board has arranged that the medical student shall be examined at the end of the second year on the studies pursued during the first and second years, and, if passed, that examination is final so far as those studies are concerned. At the end of the fourth year students are examined on the studies pursued during the third and fourth years. That method is both equitable and just, but unfortunately we have no such procedure in our dental work. That matter was strongly emphasized by Dr. Litch in an editorial appearing in the *Dental Brief*, in which he called attention to this fact, arguing that the Dental Examining Boards of the various states should arrange that when the four years' course begins students will be examined twice during their college career; first at the end of their second year on all work done during the first and second years, and at the end of the fourth year on all work done during the last two years, so that the student will not be compelled to be examined on subjects on which he naturally has become rusty.

Unless we can make some such arrangement it would not be advisable to stop theoretical studies at the end of the third year or to pass any final examinations at the end of the third year. I hope that this subject will be considered fully by all interested with the view of prevailing upon the Dental Examining Boards to give the dental student two examinations; one at the end of the second year and the other at the end of the fourth.

The second point I wish to refer to is with regard to the matter of physics, teaching physics more fully in the dental schools: I agree thoroughly with Dr. Hoff; I realize how imperfectly the subject has been taught in the past and I also realize the importance of it. Dr. Hoff referred especially to a particular branch of physics, electricity. I do not feel the importance of that so much as I do of others. In my opinion the most important part of physics is dynamics. There we come in contact with things we use every day, such as the laws governing force. How can a man make a plate and have it give proper service unless he knows something about how the force will be exerted to hold it in place in the mouth, and know the force that will give the best use of the plate? I have known many a plate to be a failure because when the mouth is closed the teeth meet in the wrong direction; instead of pressing upward and backward they press upward and forward.

And so it is with everything connected with artificial work that we have to do, not only as to modifications in the forms of the teeth but also in the way in which force is to be applied to different mechanical appliances. If we can get the student to understand the principles governing these things we will have conferred upon him a wonderful benefit. The whole subject is a large one; we are nibbling at it here and there, and I have no doubt that out of this discussion we will derive some good. But we must be careful in considering this matter so that we may approach the subject in its entirety and select from the whole matter such things as we think are of the greatest importance.

Dr. E. T. Darby, Philadelphia, Pa.:

I regret that owing to a belated train I did not hear the first part of the President's address. What I did hear, however, impressed me as being able and comprehensive in character. I have also listened with much pleasure to Dr. Hoff in his discussion. They have both outlined a curriculum which, if it could be carried out, would thoroughly equip the dental student to enter upon the practice of his profession, but I am in doubt about so much being accomplished in the time allotted. Broad culture many-sidedness are beautiful things to contemplate, but I greatly fear the tendency has been and still is to add too many things to our dental curriculum. We are striving to make too much beside practical dentists of our students. The tendency is to demand too much of our students at the expense of the practical work in the operative clinic and the prosthetic laboratory. We have already in our three years' course as much as we could reasonably expect a dental course to furnish. The men who have become great have wrought their greatness since leaving college. It has taken more than four years to make a Black, a Barrett, a Miller or a Brophy. All that the colleges can do is to lay the foundation, and if the student is made of the right material he will complete his education in a scientific direction after he has received his diploma. I may surprise you by the statement, but I have the courage to utter it, that I believe we made better practical dentists twenty years ago than we do today. We did it because there was less demand upon the student's time in acquiring a knowledge of chemistry, anatomy, physiology, histology, bacteriology, osteology, etc., etc. The student of today spends more time in learning these things, good as they are, than he does in the operative clinic and the mechanical laboratory.

We are about adding another year to our course, and I would make a plea for a year of practical work. Few men are competent to practice dentistry when they leave college. They lack the skill which practice alone can give them. It is only by doing over and over again the operations which the dentist is called upon to perform that he becomes skillful. All men are not alike apt in learning. One man will accomplish in three years what another will fail to do in four. Let the work of the fourth year be of such a character that the mediocre man can perfect himself in the point where he is weakest and the man who has mastered the curriculum of the three years can do research work in the fourth. It seems to me that the one important thing for us to do is to make good dentists, and although we may succeed in turning out good chemists, good anatomists, good histologists, good bacteriologists, if we do not turn out good practical dentists we are falling short of our duty as teachers.

I beg of you, then, as one who, like yourselves, is interested in college work, make this fourth year which will soon be added to our course largely a year of practice, and, my word for it, we shall graduate men better qualified to practice dentistry.

Dr. Wm. C. Barrett, Buffalo, N. Y.:

I am heartily in accord with what the previous speaker said until he reached a certain point, from which I must diverge. That point has reference to the character of the teaching. Four years is certainly none too much for our elementary training. The idea of contracting and condensing all our instruction into three years is an absurdity, when we take into consideration the extraordinary expansion of the curriculum made necessary by the growth of dentistry during the past decade. We have added science to science, and study to study, until the lecture schedule is so congested that scarce time is left for eating and sleeping on the part of the diligent student. I tell you that we cannot do good work in this way. The great trouble with our schools and teaching today is that we are hurried too much. We can do little more than to "cram" students, and you well know that mental indigestion is the natural result of such a process. You are aware that in all schools it is sometimes the case that at the close of the term a bright student who has done little in the class room during the whole term proceeds to "cram" for the examinations, and he may readily be able in this way to pass them successfully. But he has consumed his mental food so fast that there has not been time for perfect assimilation. He has "bolted" wisdom, as some greedy children do their dinners, to the ruin of the digestive apparatus. This kind of either mental or bodily feeding is the worst possible. Under it we are even now working our students too hard. We are not teaching deliberately, calmly, slowly, effectively, piling fact upon fact only so rapidly as the mind of the student can assimilate each and make it a part of his educational structure. When we attempt to give three lectures in one forenoon, each an hour long, perhaps one on anatomy, another on histology and a third on chemistry, one following the other, they become a confused jumble in the mind of the average student; his apprehension and comprehension are overtaxed; his appetite is clogged; his assimilation is obstructed; the principles inculcated remain an undigested mass, if they find lodgment at all. There is no time for reasoning; we cannot *educate* (educo—to draw out); we can only thrust in that of which little use can be made; there is no opportunity to make practical use of that which is imparted. This I maintain is not to educate. It will not make the best practical men. Under it we shall in time degenerate into intellectual prigs who know all of dentistry save its practice.

The proper method of teaching, the teaching which is successful, is that which is done deliberately; giving time enough for the assimilation of the facts, opportunity thoroughly to comprehend them and then to compare them with other related truths. When the student is driven too hard, forced to the extreme point of endurance, there is no perfect education, and there can be none.

I am quite in accord with the previous speaker when he says that we are loading up our curriculum with sciences and subjects which should be placed in the preliminary course. Is a man to enter on the study of applied science without a knowledge of physics; should he go back and learn his a, b, c after he has started on a course of technical training? No, he must have an elementary schooling which he should receive in his preliminary course, and then we can build on that structure, and rear an edifice that shall endure, that shall be harmonious and symmetrical and perfect in all its parts.

Concerning the fourth year which we are about to assume,—I thoroughly believe in the method pursued in New York in the medical schools, that in certain basal studies the students shall be allowed to take their final examinations at the conclusion of the work in those branches, that their last term may not be crowded too much. Not that I would advocate having our students take their final examinations at the end of the second or third year, except in such basal studies as form the foundation for their real professional work. My idea would be at the end of the second or third year to finish and take the final examination, not only in college but at the hands of state dental examining boards, in anatomy, chemistry, physiology, materia-medica, embryology and histology, with possibly one or two other studies, so as to relieve the congestion of the curriculum,—the state dental examining boards, where there are such, should admit to final examination under the proper restrictions, for students must take them when the matter is fresh in their minds. Thus they can devote their fourth year to the applications of that which they have previously learned. I do not mean that I would postpone all practical work until the fourth year. The principles should be applied as fast as they are acquired. I would not make the fourth year a post-graduate course, but I would include in it much that can now be only acquired as post-graduate work. I would devote the fourth year to the higher expressions of prosthetic and operative procedure, and I would in addition give thorough instruction in oral surgery, pathology, therapeutics, diagnosis, biology, etc. After such a course we might hope to see graduates grounded in that of which practitioners of the present day talk a great deal, but of which personally they have no comprehension whatever.

The complete course of study, the general curriculum then should include all necessary branches, and should not close until the final fourth year. Hence, simply to devote the whole fourth year to practical work is robbing the preceding classes of that which might with propriety, some of it at least, be given to them, and at the same time it is depriving the senior or fourth year class of very much of scientific information, of that more advanced knowledge which should form a part of the whole curriculum.

We can only arrive at a wise conclusion by a comparison of ideas and thoughts and methods in the consideration of this subject, and I am thoroughly convinced in my own mind that the fourth year must include a fair proportion of didactic as well as practical instruction. Just what the proportion will be depends upon the instructor, because the really competent teacher will certainly adapt his instruction to his classes. He cannot be taught that; the wise teacher must be a wise man; a man who cultivates his mind; to a certain degree an ascetic, a recluse, who denies himself the luxuries of life and devotes himself entirely to intellectual studies; who is competent properly to disseminate knowledge and to discriminate amongst studies and between students. I say he must to a degree be an austere man, of hermit proclivities. That follows as a matter of course. He cannot avoid seclusion or the mortification of the flesh. If he devotes himself to his extremely rigorous but ill-paid calling, he will have neither time nor money for self-indulgence or even social recreation. He cannot attain to absolute success except through absolute consecration of all he has and all he is to his work. He must find his reward from within, and not by accumulation from without. How many are willing to pay the full price?

Dr. Truman W. Brophy, Chicago:

A university that is complete in all its departments must teach everything. Each one of those departments is supposed to represent some special line of study, or some special branch of knowledge. The essayist has spoken of our work, of our calling, as a specialty in medicine. If we take the university, then, and extract from each of its departments all that is contained in medicine, or take, for instance, the department of medicine; if it enhances dentistry, then dentistry is a specialty in medicine. If we find after careful examination of this special branch of education, medicine, that there is not in it dentistry, or there is not in it that training and work in the laboratory and in the lecture room and in all its departments the teaching essential to make the dentist, then dentistry is not a specialty in medicine. We can take from it only that which is in it, and dentistry is not in it. Diseases of the teeth are more prevalent than any other disease known to mankind, and yet it is a fact that no medical man can deny that the curriculum of the medical school makes no provision, generally speaking, to teach this important branch of medical science.

The physician oftentimes labors against enormous odds in attempting to make a diagnosis of lesions dependent upon diseased teeth for their origin. He gropes in the dark and administers remedies when the disease is due to some local disturbance which he has not been taught to recognize. Consequently dentistry, as we accept the term to include all we teach in our schools of dental learning, is not a specialty of medicine. We might say that it is a specialty in the great science of chemistry with equal propriety. We might say that it is a branch of electricity because we use electricity. Medical men and medical faculties oftentimes labor under a misapprehension when they believe that certain subjects taught in medicine exclusively pertain to medicine. I do not wish to wander from the subject more than to say that chemistry is a science in itself; the purest science except mathematics. It has a firmer foundation, and its laws are more fixed than any other science except mathematics, and yet no one has ever claimed that mathematics is a department of medicine.

I enjoyed the President's address very much, and if you will go over it carefully and study it, as one must do, you will find that he has mentioned many subjects that have absolutely no connection with the medical school; in fact, they cannot be taught as a part of medicine.

There is no one living who has a higher appreciation of Professor Darby and his work as a teacher in operative dentistry than I. I understand why he took up the line of argument he did, but I must differ with him in some respects, especially when he speaks of whether the dentist of today is a better dentist than he of twenty years ago. I certainly believe he is. If this were not the case, I think the outlook would be very discouraging. He is a better dentist, because he is able to recognize the value of bacteriology. He is a better dentist today because he knows that when he puts something on an exposed pulp it is not a question of what it is, but it is a question of pulp infection. In the early days of dentistry, when Atkinson taught us all that when he applied oxychloride of zinc to a pulp it would keep that pulp from dying, the question of infection did not enter our minds at all. We knew nothing about it. Therefore, the dentist of today is a better dentist, because he recognizes these facts.

Dr. Darby tells us what, in his estimation, this added fourth year shall be devoted to in the curriculum. Has it not occurred to us all that the subject of irregularities, the great field of orthodontia, is enough to occupy a man's time in the fourth year, if he did nothing else, and even then he would be far from a master in that subject at the close of the year. He could take up work in porcelain, which was not taught twenty years ago, as it is today, and put in all his time on it, and still he would not be a master in that department. With the advent of crown and bridge-work, porcelain work, with a knowledge of bacteriology, a better knowledge of physiology, which has been revolutionized in the last twenty years; with these I hold that the dentist of today is a better man, a better dentist; and the student of today is superior in his training as a dentist than was the student of twenty years ago. So when we sum up the work that is being done today and analyze the work of twenty years ago, I think we must come to the conclusion that the dentist of today is a better dentist than he was ten or twenty years ago. And I am confident that with the addition of one more year, and with the work better systematized than ever before, the dentist of ten years hence will be vastly superior to the dentist of today.

Dr. A. H. Peck, Chicago:

I listened to the excellent address of our President with much pleasure. I was particularly impressed with the liberality displayed throughout the address. I was especially interested in the subject of physical diagnosis, a subject which is to be brought before you more specifically by another gentleman later in the program; a subject which has been of great interest to me for a long time, and I may add that if it is possible to say truthfully of me that I have had any hobby, it is this subject of physical diagnosis. It is one on which I have laid special stress ever since I have been teaching.

I am also pleased that the discussion in the main has taken the turn it has, a consideration of the curriculum in general. I believe that this is the place for us to discuss the college curriculum. We have assembled in this association none but individuals who are interested in teaching and in getting at the best methods for carrying on their work. I wish that it would be possible for this association to give more time to the discussion of this subject, and that before an adjournment is taken a committee would present to us in crystallized form an outline of a college curriculum, based on a four years' course, that would be acceptable to all the colleges. This is a much better place and time for the consideration of this subject than the National Association of Dental Faculties.

Dr. J. H. Kennerly, St. Louis, Mo.:

The principal thing for us to do is to see if we cannot come to a unanimous opinion as to what the work of the fourth year should consist of. The suggestion was made by several of the speakers that the state boards of dental examiners adopt the plan of the board of medical examiners of the State of New York; that we give our students final examinations at the end of the second and fourth years of their course. You must remember in this connection that in many of the states of the Union examinations are not required for graduates. They are not required in this state nor in many others. If you are going to force these students, as I understand it, to be examined by State Boards every two years it would be rather an expensive procedure for them, especially in those states where they must be examined before they can practice.

With reference to the work of the fourth year: I agree with those who said that there is nearly work enough as it stands today to cover the four years if it is properly divided. But I cannot agree entirely with the speaker who said that the fourth year should be practical entirely. I believe that some didactic instruction should be given throughout the entire four years. According to my recollection of the recommendations offered by our President, we teach in the school with which I am connected all the subjects save two; and those two are physics and Physical Diagnosis. We go very thoroughly into chemistry, pharmacy and metallury so that we have but very little to add to our curriculum. The question now is,—where shall we add it?

Dr. G. V. Black, Chicago:

I would like to speak on one point that has been referred to in the discussion by one of the speakers. It is a very important point, too, in connection with this matter of education, and we should strive to understand it. The education of the machinist has been referred to, and the fact mentioned that it requires four years to make a machinist. During these four years this man may spend all his time solely in the machine shop; solely at practical work, so that he may become able to turn his journals to a nicety, cut a toothed wheel perfectly, adjust his machines perfectly, do excellent mechanical work, but if this man has not during this time been studying his mathematics and his physics, the laws of motion; and if he has not been studying mechanical drawing and all those things, he will be simply a mechanic to be directed by the master; nothing more.

Now, gentlemen, we may make men who will fill a cavity well; we may produce men who will make a plate very well, indeed, but they are like the mechanic who has stuck to his machine shop. They are men who can work only when directed by others who have had a superior education along the lines relating to the specialty they fell into in dentistry. We expect to so equip each man that he will be a master, and until we do that we are not making the dentist we wish to send out to practice. Of course, we do not expect to do all this in four years, but we must give him the basis upon which to work in the future in his practice that he may work himself up on this point.

Dr. D. R. Stubblefield, Nashville, Tenn.:

I want to present, first, a congratulation; second, an expostulation, and, third, a corroboration.

I want to congratulate our President upon the address in its entirety; broad, comprehensive, logical, intelligent. This association is to be congratulated that we begin to look at subjects so broadly. We are reaching a point where we can look over the field and intelligently decide what is best to do, and we can intelligently direct our means. As the exponent of conservative wisdom, to which we are trending, I congratulate our President in making such a showing.

My expostulation is that though all this is good, exceedingly good, yet it is utopian. I do not believe that we can accomplish that much. I am convinced that we have taught too much in the time at our disposal, with the result that we have produced a mental dyspepsia rather than assimilation, growth and development. What we want is not ingestion but digestion, so as to permit our men to grow broad and strong. We have not had sufficient time to mature. We have a smattering of many things, but "a little knowledge is a dangerous thing," and unless you drink deeply to sober yourself again you are intoxicated to your own downfall. I have always looked upon the college and the teacher as a foundation building combination. No school teacher expects to perfect his pupil, but merely to give him the material and the opportunity that Dr. Black spoke of to make himself. Put the student in the way to help himself; that is the best you can hope to do with him. Did a teacher ever make a man? No; there never was a man who was not self-made. There is no power on earth to wake up what is not in a man, and make a man of him.

We have not been able in this short length of time to give the young man a chance to come to himself; to understand what he has been filled with. Therefore he has staggered along and done as well as he could. The wonder is not that so few have succeeded but that any at all succeeded from the stuffing process in vogue in our colleges. We have cause to congratulate ourselves that some men have had intellectuality enough to digest all that was given them and make use of it.

And now the corroboration. The intelligent presentation of this extensive possible course is very gratifying. But I am satisfied, at least from my own standpoint, that what we need is more time and the cultivation of judgment. I believe that if Dr. Darby is to be sustained that it occurs out of the fact that the course was limited and the man big enough and strong enough to master that which was presented. Even in the limited time at his disposal he managed to get more out of the course than do most of our students today. He was a thorough practitioner, a man who knew; a man who could do things. It is not so much what you know as what you can do. You never know a thing until you can do it yourself.

DR. EDMUND NOYES, Chicago:

It appears to me that those who have discussed this paper are several steps behind the President's address. We do not want to add a fourth year to our dental course just to put on an extra frill or two. We must have a four years' course because we cannot do all the work in three years that ought to be done. Then we must have a hospital course or a laboratory course in special investigation work, or something of that kind. Both these things are important. Gentlemen, the greatest need of the dental profession today is to make professional men instead of artisans. We are in greater danger than most men realize, of becoming a company of skilled workmen instead of a great profession.

Previous to twenty or thirty years ago we had a few professional men in our ranks, and we had a great many mechanics and artisans, and if we are not careful the time will come when we will have the same thing again, and it will be the fault of the colleges if the rank and file of our practitioners are merely skilled mechanics and business men instead of being professional men. We shall not be without professional men, because many will become such by force of personal character, ambition and attainments. But the purpose of dental education ought to be to lift up the whole number of graduates into professionalism. If you are going to do that you must make students as well as operators and mechanical men. In order to do that you must teach them something of those sciences which are at the foundation of all professional knowledge and practice. You must awaken in the students some interest in these subjects; give them time enough to learn something about them, and the four years' course should be used more for the purpose of strengthening this aspect of dental education than for anything else.

I do not wish to disparage for a moment clinical or technical instruction; in fact, it should be made stronger rather than weaker, but the weak side of dental education today is the scientific and the professional side.

The most important thing this association can do is to ascertain and agree upon what should be taught in the first year of the four years' course. We must begin that next October, and if we know just what we are going to teach in that first year of the full four years' course we can agree upon the second year's work in time, before the second year is begun. But if we talk in general terms, as we have done so far, we will not arrive at any conclusion, and the new term will be upon us without finding us ready to say just what those students should be given for their work in the first year.

Dr. Geo. V. I. Brown, Milwaukee:

Some years ago I had occasion to take up this subject before this association. I at that time made some calculations as to the actual amount of time that we place at the disposal of students during a seven months' course, and it became clear to me that there were not hours enough in which to teach properly those subjects which were embraced in our curriculum at that time. As nearly as I can remember the figures at this moment, in a seven months' course, if you could work the student for eight hours a day he would have in actual time less than 1600 hours. Anatomy, three times a week, gives him between 80 and 90 hours of anatomy. You cannot teach anatomy, even such a small amount of it as dental colleges must require in that length of time. When you figure out the time the student puts in on each study you will find that it approximates about 70-80 hours for each branch. Manifestly it is impossible to teach those studies thoroughly in any such time as that. There is the greatest possible need for this fourth year in order that those subjects which are being taught at this time may be taught properly and still give the student sufficient opportunity to digest what he is expected to learn and understand.

In this estimate we allow only fifteen hours a week for laboratory work and practice in the infirmary, which is certainly considerably less than it ought to be. It seems to me that this association can do no better than to first consider the time that it is going to recommend for each particular branch, allowing a little additional time which will go with the fourth year, and then take up the very timely suggestions of our President with regard to additional study. I think the less time we spend discussing whether dentistry is a specialty of medicine the better for all concerned.

Until we can practice dentistry without pathologic conditions of any kind, or can prove that diseases of the mouth and teeth have no share in disease elsewhere, we must acknowledge a relationship to general medicine of some sort. What that relation is to be will depend very largely upon how we deal with just such matters as are properly before us for discussion at this time.

Dr. W. E. Grant, Louisville, Ky.:

These remarks are all very good and in line with what I have felt as to the disposition of the fourth year; yet it is wasting valuable time to talk about this matter without arriving at any definite conclusions. We have a Committee on Curriculum, and I do not see why that committee cannot report at this meeting. They may offer us the solution of this vexing problem. It is not a question as to what to do with that additional year, but how can we get the most good out of it; what subject or subjects ought to have the preference over others. Some of them are more important than the others, and it is for us to determine which of these subjects are of the most importance to the future dentist.

THE DENTAL REVIEW.

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EDITOR: C. N. JOHNSON, L. D. S., D. D. S.

THE GOVERNOR VETOES THE DENTAL BILL.

During the recent session of the legislature in Illinois a new dental bill was passed which promised much in the way of protection to the people of the State against the abuses so prevalent in the past connected with bogus colleges, diploma mills, and the horde of illegal practitioners which have so long infested the State. It was claimed by competent and unbiased judges to be one of the best dental laws ever passed by the legislature of any State, and the hope was strong that it would not be a great while before the regulation of the practice of dentistry in Illinois would be lifted from the mire of disgrace into which it has frequently fallen in recent years.

The bill had run the gauntlet of the usual active and persistent opposition of those selfishly interested in its defeat, but thanks to the able championship of Senator A. C. Clark and Representative Boulware it finally passed both houses. Then came the Governor's veto. The sole reason expressed by Governor Yates for his action was based on the provision in Section 1, relating to the appointment of the Dental Examining Board, which read as follows: "The members of said board shall be appointed by the Governor, three of whom shall previously have been recommended by the Illinois State Dental Society," etc. The Governor's contention was that it took the power out of the hands of the executive and placed it with a society, a principle to which he was unalterably opposed. But we fail to see in what particular Governor Yates' position was well taken. There was no intention either on the part of those framing the bill or those interested in its passage to usurp any of the prerogatives of the executive or to foist society men into State offices. It was merely the observance of a well-recognized principle that the intelligent members of any profession are naturally calculated to be better informed as to the suitable men in its ranks to have supervision of the enforcement of any act passed for the regulation of the

DOMESTIC CORRESPONDENCE.

To the Editor of the DENTAL REVIEW:

My Dear Sir:—I attended with a great deal of interest the anniversary meeting of the Odontographic Society in February, and among other things, I enjoyed more than I can tell the paper on Education, advanced though it was, by Dr. Carlton of San Francisco.

His plea for a higher, broader, and more advanced, preliminary education met my approval most emphatically, and but for the lack of time at the disposal of the Society, I would have been pleased to have spoken before the assembled guests my thanks to the essayist for the position which he advances. How such men as Drs. Morgan, Patterson and others, could speak and think as they evidently do, was a surprise to me, and explained to me the lack of progressive education in our specialty. I regret more than I can say that I did not have as a young man, and a pupil, the advantages marked out by the essayist. I am satisfied that I should have been better qualified for my work, and a broader-minded man had I had such advantages. I am greatly disappointed that the profession seems to stand for the thought that a broader and wider education makes the man a poorer dentist. It is clearly an untenable position because anything which educates the mind, heart or hand, better fits anyone for any work in life. The fact that some men who have had a university education, or have had a medical education, are failures as dentists, is admitted, but that they are failures because of these advantages, is absurd.

I have seen many failures of men with a medium education, and of men with no education, but it is reserved for a few weak and narrow-minded spokesmen (as they think) of the profession, to claim that a broad education dwarfs a dentist. The position advanced by most of those who discussed this paper, that a man should have an office training previous to his graduation, is to my mind misleading. What I should endorse more perfectly would be to have much greater care taken as to the kind of men, morally and professionally, who control our specialty schools for education. To my mind, methods of conducting office practice are secondary. The man who is successful in controlling and conducting any business is the man who is natural and himself; because Dr. C——, if you please, controls a large following by his peculiar personal methods and ability, is no reason to believe that by following the same plans that he follows, I should be as successful as he. His own personality enters into the matter, and what we should have are graduates who have been educated to believe that the acquiring of a dollar is not and should not be the height of their professional ambition.

My thought of our work in life is that we may do good, and be of advantage to the world through our patients directly and indirectly. The fact that to acquire this preliminary education spoken of by the essayist, would place a man in his professional work a few years later, is no disadvantage to the world at large, neither to the man himself. Few men are fitted in maturity to properly counsel, advise, design and execute the interests of their patrons at the age at which most of our graduates leave their Alma Mater.

I bespeak for the principles laid down by the essayist, the hearty endorsement of the profession in the near future if we expect to have accorded to us the principles of advancement characteristic of all of the nobler professions of this, the beginning of the Twentieth Century, and shall look for the time to come, and that soon, when our specialty schools will be conducted for other than financial and personal ends of scheming and oftentimes unprincipled men.

Yours sincerely,

A. E. BALDWIN.

AN ANSWER TO DR. THORPE.

In the April number of the DENTAL REVIEW, Dr. B. L. Thorpe, in a "Supplemental Report" to a biographical sketch of Dr. S. P. Hullihen, republishes the report of an operation that Dr. Hullihen performed in 1848.

This report is evidently made with the intention of creating the impression that it is the same as that operation known as "Double Resection of the Mandible," probably first performed by Dr. V. P. Blair in 1897, and described and reported in the *Dental Cosmos,* July and August, 1898; also in the *International Dental Journal,* October, 1898; February, May, and August, 1899. Had Dr. Thorpe been familiar with the literature, or with the principles of the two operations, he would have known that they are very different, Hullihen's involving the alveolus only, while that performed by Dr. Blair involved the double resection of both alveolus and jaw.

EDWARD H. ANGLE, M. D., D. D. S.

REVIEWS AND ABSTRACTS.

Principles and Practice of Filling Teeth.—By C. N. Johnson, M. A., L. D. S., D. D. S., Professor of Operative Dentistry in the Chicago College of Dental Surgery. Second edition.

S. S. White Dental Mfg. Co.

It has taken little more than two years to exhaust the first edition of this work, which is the best testimony that can be adduced of its professional worth and estimate. In my review of the first edition I said it was a classic—that is, it was an excellent and acknowledged work of authority. The correctness of this estimate has been justified by the almost universal verdict of approval wherever this book has found a student.

The progress made in the dental profession between the time of the first and second editions is clearly noted in the chapters found in the latest edition, which is evidence of the author's susceptibility to the constant shifting and readjustment of details in our search for perfect methods. There are a few such changes that may be noted throughout the second edition, but the most notable changes are to be found in the chapters upon Mallets and Making Inlay Fillings. The experiments of Dr. James Truman, of Philadelphia, and Dr. Clayton H. Stearns, of Owatonna, Minn., with a view of determining *the kind* of mallet best suited to the condensation of gold have shed a light upon this subject hitherto unknown and unsought. These experiments have compelled the recasting of opinions held by the author, in his first edition, and the acceptance of the views of the two gentlemen named above, because of what seems their scientific importance.

Chapter XV., Making Inlay Fillings, has been practically wholly rewritten.

The porcelain tidal wave which arose in its might and was attaining its greatest height when the first edition of this book was published failed to sweep the author from his secure moorings to which he had clung so long and served him so faithfully. Not a few were inclined to criticise the author for what was considered his ultra conservatism upon this subject at that time. With the recession of this porcelain tidal wave the author has taken a more advanced stand and gives it a permanent placing in operative dentistry, at once recognizing its place and its limitations. The position the author has taken upon this important subject—a phase of practice concerning which a few are intemperately enthusiastic—will, in the opinion of a vast majority of the profession, prove tenable.

The gold inlay and its place in operative procedure is given a prominent placing in the second edition and will commend itself to that class of workers who may be characterized as conservatively enthusiastic inlay workers.

We heartily commend this work to all students of modern dentistry as the best work upon operative dentistry that has appeared to date. C. E. BENTLEY.

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, THE DENTAL REVIEW, 55 State Street, Chicago, Ill.]

To Remove Stain from Necks of Teeth.—In cases where the gingival third of the teeth is coated with dark green stain, apply equal parts of tincture of aconite, tincture of iodine and chloroform. Then use a brush with pumice and if necessary repeat the application. W. C. SMITH, East St. Louis, Ill.

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Polishing Stains from Lingual Surfaces of Lower Incisors.—Frequently it will be found difficult to reach these surfaces with the ordinary rotary brushes. Substitute for these a moose-hide wheel about one-half inch in diameter, and run it as nearly as possible parallel with the long axis of the tooth. In this way the most inaccessible surfaces may usually be reached. The wheel, however, is not so effective for accessible surfaces as the brush.

◆

Emery for Polishing Fillings.—Where it is practicable to employ disks for polishing fillings, emery paper is found more effective than sand paper. Begin with coarse emery disks and when the filling is ground to the proper form a fine one can be employed to take out the deep scratches, after which the filling can be readily polished with cuttle-fish disks. This will apply to all metal surfaces worn in the mouth. For rubber work, however, sand paper is preferable.

Protecting Cement Fillings from Moisture.—Mistakes are frequently made by conscientious operators in keeping cement fillings dry too long after insertion. With many of the best oxyphosphates in use to-day the only effective means of preventing shrinkage of the filling is to allow it to become moist shortly after insertion. Manufacturers should test their cements and indicate on the packages the proper length of time after mixing to allow moisture to come in contact with the filling.

Removal of Deposits.—In cases where there is a narrow band of serumal calculus under the free margin of the gum on the proximal surfaces of the teeth, a very effective method of exposing it to view so the operator may more readily remove it is to pack the inter-proximal spaces with a pledget of cotton for a few minutes in advance of the operation. This forces the loose gum back so that the deposit may be clearly seen. A scaler should be at hand for immediate use the moment the cotton is removed, otherwise the gum will creep back over the deposit before it can be scaled off.

Treatment of Congested Gums.—In the treatment of congested gums, whether involved in pyorrhea alveolaris or not, iodide of zinc in the crystal form has often been recommended and applied with much success. It is one of the most effective agents to restore the gums to their normal form, but it occasionally seems to induce sensitiveness of the teeth, and the taste is objectionable to some patients. To overcome these limitations the crystals may be mixed with one of the essential oils to the consistency of a syrup. Applied in this form, it is fully as effective and much more acceptable.

COLLEGE COMMENCEMENTS.

THE NEW ORLEANS COLLEGE OF DENTISTRY.

Graduates 1903.—Cilton Alfred Couvillon, John Chase Crimen, Jr., Joseph Bowen Davis, A. Louis Ducasse, Marie-Blanche Fassy, Edward J. Gourdain, Lawrence C. Leggett, Arthur Lemoine, Perry Gray Lovenskjold, Mitchel Mansberg, Judson H. McCann, Benjamin Julius Nasits, Walter John Rodriguez, Richard Cornelius Root, Rupert Everett Watson.

DENTAL DEPARTMENT, UNIVERSITY OF SOUTHERN CALIFORNIA.

Graduates for 1903.—William Albert Baker, William John Brizius, Bert Boyd, Kate Diantha Buck, Forney Edwin Burt, Paul Bernard Caler, Harry Walter Hack, William Raymond Honodel, John Morrison Keagy, John Parkhill Luccock, Seitaro Saitow, Charles Davis Stambaugh, George Lyman Stookey, William Hamilton Lee Symington, Genette Francis Weaverling, Walter John Wallace.

KANSAS CITY DENTAL COLLEGE.

Graduates for 1903: Fenton Morton Canoyer, Edwin Leonard Feese, Clyde Bellamy Burnett, John Thomas Reed, Harry Hancock McKee, John Quinn Robertson, Frank Elwood Allen, Charles Ray Briggs, Virgil Rogers McCue, Gustave Joseph Boehringer, Enoch David Enloe, Otis Lester Smith, Fred Hugh Enloe, Roy Walter Grandstaff, Marvin Burt Miller, Joel Aaron Curtis, Mark James Painton, Arthur Frank Weston, Frank Marian McFarland, Earl Archibald Bonar, Ernest Watson Kennedy, Claude Oscar Tesch, Andrew Bruce Waring, James Henson Proffitt, Smith Beatty Hanna, Edouard Montgomery Hall, Hubert M. Bamford, Edward Oliver Campbell.

OHIO MEDICAL UNIVERSITY.

Graduates in Dentistry.—Carl A. Allensworth, Robert Lincoln Armstrong, Orville Taylor Atwell, Charles Albert Beck, Joseph Bertine Bell, James Evered Berry, Alexander Caldwell Buffington, George Washington Bourne, Horatio Abner Boulger, William Brewster Carr, Charles Bernard Cox, Homer Campbell Crawford, Charles Chesney Cummins, Alexis Emanuel Caron, Wilbert Roy Davis, Ervin Garfield Dougherty, James Clifford Downar, Preston Fletcher Dixon, Carl John Fackiner, George Howard Foster, Walter Damon Franck, Phelps Mac Freer, Mitchell A. Gebert, Frank August Goldenstar, Frank Stanley Goss, Harry White Groves, Walter Ford Hall, George Ellsworth Harrison, Charles Henry Herbst, Ernest Frederick Izin, Carl Baker Jeffrey, Karl Young James, Charles Bertram Keller, Robert Jink Kirk, Clark M. Leiblee, Leon Munroe Marshall, George Winfield May, Earl Leroy Miley, Thomas Corwin Miller, William Egbert Modie, Philip Monroe, Joseph Albert McCallum, James Hodge McCreary, Hova Emerson McKelvey, James Otto Newton, Edward Enoch Neary, Charles Truman Rogers, Charles Wesley Reelhorn, George Wilbur Riche, Ervin Earl Royer, Harry L. Ruble, Calvin Law Shafor, Leslie Edgar Sharp, Baron Alfred Smith, Frank John Smith, Ray Richard Smith, Herbert Stephenson Srigley, Roy Everett Turner, William Crooks Teter, Edward Earl Wattring, Sylvester Skilling Whetstone, George Wing.

MARION-SIMS DENTAL COLLEGE. LIST OF GRADUATES FOR 1903.

Marion Apple, Robinson, Ill.; John Dwight Coburn Askins, Richview, Ill.; William McNutt Collins, St. Louis, Mo.; Harry Joseph Crone, Springfield, Mo.; Carey Ernest Duff, Clay City, Ill.; Gideon Mark Dempsey, Grafton, Ill.; Isham Davis Elder, Helena, Tex.; William Pinkney Elliott, Stephens, Ark.; William Scott Farris, Redbird, Mo.; William Frederick Gerhardt, Clinton, Mo.; James Patrick Geekie, St. Louis, Mo.; Charles Stephens Holschbach, St. Louis, Mo.; Bernard Steven Hanley, St. Louis, Mo.; Thomas Goodale Hawley, St. Louis, Mo.; Robert Lehmann Hesser, Louisiana, Mo.; Harry Keehn, Glen Allen, Mo.; George Lee Kitchen, St. Louis, Mo.; John Armstrong Ladd, Clayton Mo.; Cyrus Floyd Lawler, St. Louis, Mo.; Elmer Zerse Leibrock, St. Louis, Mo.; Philip Bruce Linville, Jr., Edina, Mo.; Harvey Allen Loundagin, Dayton, Wash.; George Upchurch Mason, Scotia, S. C.; Virgil Edwin Martin, Lebanon, Mo.; Charles Francis McKay, Knox City, Mo.; Carl Milner McMahon, St. Louis, Mo.; James Davenport Morris, Boston, Mass.; Robert Harold Offill, Ashley, Ill.; Thomas Green Plummer, Birch Tree, Mo.; John Franklin Ralston, Grand Forks, N. D.; Virgil Overton Suggett, Flora, Ill.; Lloyd Elmer Summers, Glenville, Minn.; William Dixie Tiller, Conway, Mo.; Leslie Rush Wilson, Lone Star, Mo.; William Andrew Wainwright, Winchester, Ill.; Thomas Henry Walton, Salisbury, Mo.; Bruce Wallace Willis, Glasgow, Mo.; William Dick Van Winkle, St. Louis, Mo.; Redmon Herschell Woods, Memphis, Mo.

UNIVERSITY OF BUFFALO, DENTAL DEPARTMENT.

Class Roll, 1903.—William Ward Algate, Lee Allyn Badger, George Henry Brickwedde, George Barclay Brown, Robert Brown, Frank Silas Burlingame, Roy William Burlingame, William Watson Bush, Joseph Jefferson Cantwell, Winfield Byron Capron, Alphonse Clarence Champagne, Oscar Roberts Charles, Charles Mitchell Craner, William McClellan DeCeu, Arthur Warren Diefenbach, Chester Richard Downes, Henry Edward Elliott, Walter Healy Ellis, Thomas Edward Evans, James Blanchard Fish, William Humphorous Fyffe, George Wilbur Gardner, Harlan Foster Guillaume, Oscar J. Hammersmith, Fred Ernest Harper, William J. Herbig, Percy Addison Holdridge, Ernest Elmer Horton, Frank Fayette Jenkins, Emil Peter Jung, Harry Simpson Kennedy, William Henry Lane, Ernest Ralph Lascell, Clarence Anson Leek, Ross Garfield Leonard, John Augustus Lockwood, Archibald Meredith MacGachen, Joseph Francis Magner, David Talbot Main, Charles Ricketson Mair, Milton Ross Marlatt, Roswell Howard McDonald, William Wescott McElroy, George Alton McIlroy, Charles Everett McIntosh, Henry Clay Millis, Warren Ray Montgomery, Howard Herman Moyer, Lawrence Lee Mulcahy, Harvey Hotchkiss Newcomb, Edgar Delmont Newton, Dewitt Clinton Northrup, Thomas Francis O'Brien, Charles Lewis Overpeck, Gracia Abigail Naomi Paxson, Karl Ames Penfield, Walter Edward Pike, Harold Rockefeller, Clifford Ezra Rose, Charles Edward Rowland, Raymond Frederick Southwick, Flavius Bernard Stiker, Raymond Botsford Tafft, Harry Flagler Tanner, William Benjamin Tanzer, Clarence Hovey Thomas, Raymond Elliott Thomson, Edwin LaFayette Todd, Elberta Orlette Tousey, Richard Vernon Turner, Daniel James Vedder, Jr., Kenneth Downs Watson, Charles Bougie Watts, Wiley Hardy Wilson, Florence Wrean Wilson.

CHICAGO COLLEGE OF DENTAL SURGERY.

Graduating Class, 1903.—Edward Hart Allen, Andrew Bertram Anderson, Bernard Aronson, Harry Armstrong, Clarence Jacob Ash, Francis Victor Babcock, Daniel Judson Bagshaw, Ralph Kissinger Baker, Ralph Maywood Barnes, Robert Bell, Henry Judson Bennett, Knute Berg, Oscar Merton Bisant, George Washington Booren, William Tecumseh Boyer, Edward Glessing Brown, Robert Herman Buck, James Edward Buckley, Ph. G., Daniel Shaw Buisson, Lyman Leland Burroughs, Harry Esmond Byars, Frank H. Carrels, Bertram Frank Cihlar, George Alfred Clarke, Charles James Clark, William Henry Clark, Willoughby Ray Cloud, Claude Milne Cole, Daniel Austin Collison, Elbert Ellsworth Cone, Myron Simpson Cook, Charles Clinton Cooley, F. R. Connor, William Francis Corbett, Charles King Corsaut, Emmett DeForrest Cretors, Charles Edward Crombie, Clark Manley Cryor, Ernest Garfield Dannatt, Seeley Adelbert Darling, Albert Dolson Davis, John Charles Davis, Ph. G., Hugh Delahoyde, John Arthur DeMamprey, Robert Hezzie Dishman, Frederick Augustus Eastman, Oscar Walter Eaton, Robert Odemar Eberhart, Adams Wesley Ensign, Louis Weber Evans, David Melvin Fee, James Carlton Ferrell, Ralph Irwin Findley, B. L.; Charles Royal Flatt, Harry Vincent Flynn, Robert Ignatius Flynn, William Francis Foster, Charles Balmer Fraser, Gustav Emile Fritz, ReRoy George, James William Gibson, Forest Eugene Gillespie, Charles Monta Gore, Samuel Boxall Graham, Pardee Walter Greene, Arthur Gross, Henry Guenzig, Charles Leslie Hale, Sherrell Woodworth Hall, Thomas Marion Hall, Will Woodruff Hanson, Marcus Aurelius Harlan, George Peck Harvey, Charles Andrew Hay, Lyle Richard Head, William Epley Heller, Henry John Henze, Paul Lorenzo Hoadley, Alfred

Henry Hoermann, George Richard Horley, Claude Dewain Houston, Joseph Algernon Hutchison, George Edgar Johnston, Edward S. Jones, George Paul Keefe, David Ervin Kelly, Elmer Gilbert Kesling, Harvey Burner Kibler, Arthur Leroy Knapp, Herman Cassimer Lacharite, Loren Oscar Landon, George Phenecie Light, Leslie Lynn Little, William Frederick Lord, Walter Edward Lowrie, Gustavus Munson Lovering, Thomas Aloysius Lynch, Adolph Mach, Garabed Kinos Magarian, Albert Charles Manz, Joseph Mietus, Frank L. Miller, Oscar Allen Mitchell, Leon Marlin Muedeking, Harry H. Murphy, Fred Edgecomb Murry, Harold Alfred Muzzall, Lachlan Cameron MacMurray, Austin Charles McGuire, John Sterling McLaren, Sven Narbo, Samuel Robert Neidigh, Charles Henry Nelson, Marcus Arnolphus Neumeyer, Virgil Bingham Newell, Walter Bartlett Noe, William Ocasek, Charles Jerome O'Dwyer, James Charles O'Herrin, Luther Thomas Outten, Charles Stuart Patterson, Harry Clayton Patterson, Leon J. Patterson, Henry Christian Peisch, Walter Shelly Phelps, Loren Maclay Pomeroy, Charles Franklin Port, Charles Kelley Porter, Jerry Arnold Prescott, Franklynn James Roy Price, Philip Bradley Proudfoot, Frederick Page Randall, Robert C. Rath, Daniel Brigham Read, J. H. Reading, John Augustine Regan, John Lewis Reuter, Aaron Kilbourn Reynolds, Claude Edgar Richards, Henry Sidney Rosenholtz, Garrett Peter Robertson, Otto Scheiner, Arthur Jacob Schindler, John Michael Schram, Anton John Schurer, Frederick Joseph Sharman, Philip Herbert Simpson, George Lindsay Smith, Isaac Samuel Smith, William Alanson Smith, Charles William Somerville, Orley Roy Speirs, Allen Calvin Stafford, Max Leland Sterne, Charles Sugden, Earl Clifford Taylor, Russell Ray Tobey, Enoch Van Cott, Herman Van Hasselt, Richard Thomas Ward, William Lorin Warren, James Oscar Werntz, Joseph Wallace West, Frank Edwin White, George William Wilcox, Odin Neil Williams, Robert Arthur Williams, Clarence Garfield Winchell, Roy Ernest Wyman, William Charles Crossley Wells.

OHIO COLLEGE OF DENTAL SURGERY.

Names of Graduates.—George M. Bachelor, Jackson, Michigan; Jeddy D. Becker, Angola, Indiana; Fred G. Beroset, Wauseon, Ohio; Isaac Dodd Best, Millersburg, Kentucky; George P. Bichler, Chillicothe, Ohio; Jerry Emery Blosser, Farmer, Ohio; Andrew Wall Boyd, Cambridge, Ohio; Charles A. Brown, Dayton, Ohio; Homer Thomas Brown, Angola, Indiana; Ewing V. Burns, Troy, Ohio; Robert C. Cameron, Jewell, Ohio; Garfield Canon, Stoneboro, Pennsylvania; Paul Cassidy, Covington, Kentucky; Fordyce H. Chapman, Spencer, West Virginia; William E. Chester, Ebush, Ohio; Edward H. Clarkson, Jacksonville, Florida; George Evans Collins, Flemingsburg, Kentucky; Gilbert E. Conroy, Detroit, Illinois; Ellery C. Cox, Cincinnati, Ohio; James Ogden Crutcher, Winchester, Kentucky; Henry Elmer Davis, Bloomington, Illinois; Edgar Horace Eberle, Chillicothe, Ohio; Bert J. Edwards, Napoleon, Ohio; Abraham Eisenman, Cincinnati, Ohio; Julius B. Ellison, West Union, Ohio; Edward B. Eshman, Cincinnati, Ohio; George Stanley Evans, Delaware, Ohio; Robert E. Fishback, Pine Grove, Kentucky; Bruce David Flaugher, Cincinnati, Ohio; Harry Charles Frayer, St. Paul, Minnesota; J. Carson Gow, Wheeling, West Virginia; Henry I. Grimes, Pittsfield, Illinois; Augustus R. Hammerle, Hamilton, Ohio; Wilbur E. Hoffhines, Ashville, Ohio; John R. Hoffman, Bellefontaine, Ohio; William A. Holtz, Greenspring, Ohio; *Charles E. Hutchinson, Welch, West Virginia; Jennie D. Jenkins, Ironton, Ohio; Arthur G. Johnson, Caldwell, Ohio; Ralph K. Kemper, Churchville, West Virginia; Charles F. Kirkland, Hudson, Indiana; Frank L. Kinnison, Hurricane, West Virginia; Edward John Lang, Cincinnati, Ohio; Bennie A. Long, Knox, Pennsylvania; Marion M. Lower, New Alexander, Ohio; Charles H. McCall, Portsmouth, Ohio; Hugh C. McClelland, Goshen, Ohio; Frank A. McCullough, Troy, Ohio; Thomas W. McFadden, New

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*Deceased.

Vienna, Ohio; Abram B. McKague, Teeswater, Ontario, Canada; Gavin W. McMillan, Morning Sun, Ohio; George LeRoy Mallett, Defiance, Ohio; Phister H. Martin, Gallipolis, Ohio; Robert Guy Morris, Olney, Illinois; Harvey B. Morrow, River Falls, Wisconsin; Harry J. Morlidge, Newport, Kentucky; A. Clarence Musgrave, M. D., Ohio City, Ohio; George Nerish, Cincinnati, Ohio; William F. O'Donnell, Cincinnati, Ohio; Roscoe E. Peelle, Wilmington, Ohio; R. Ray Peters, Lancaster, Ohio; Robert E. Plath, Albany, Minnesota; Everett H. Price, Lynn, Indiana; John E. Price, Belpre, Ohio; J. Harry Rardon, Cincinnati, Ohio; Harry Maltby Rogers, Troy, Ohio; Archie J. Rose, Knox, Pennsylvania; Harry E. Rudman, Ravenswood, West Virginia; Frank G. Sandker, Cincinnati, Ohio; Willis F. Sanford, Atwater, Ohio; Carlos H. Schott, Harrison, Ohio; John W. Schaffer, Hamilton, Indiana, Orvis Singmaster, Washington, Iowa; Dickson L. Singleton, Beaver, Pennsylvania; Jay Walter Stroh, Fremont, Indiana; Allen D. Sullivan, Covington, Kentucky; Willie Ildo Tate, Kokomo, Indiana; Sidney R. Teasdale, Batavia, Ohio; A. Verden Watkins, Defiance, Ohio; Nathan M. West, Berryville, Ohio; Fred H. Williams, Gallipolis, Ohio; Ray Wolfe, Lancaster, Ohio.

MEMORANDA.

It is claimed that the admixture of an equal quantity of Listerine with peroxide of hydrogen will maintain the stability of the peroxide a much longer time than would otherwise obtain.

WISCONSIN STATE DENTAL SOCIETY.

The thirty-third annual meeting of the Wisconsin State Dental Society will be held at West Superior, Wisconsin, July 21, 22 and 23, 1903. The usual railroad rates will be obtained. The profession is cordially invited to be present.

T. M. Welch, President.
W. H. Mueller, Secretary, Madison, Wis.

MEETING OF THE WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The next meeting will be held in Superior, Wisconsin, July 20, 9 a. m. All applications for examination should be in by July 15th. Candidates must be graduates from a recognized college or a regular practitioner of dentistry for four years or an apprentice to a reputable dentist for five years. Beside the regular written examination the candidate will be required to insert a contour gold filling, furnishing all instruments and materials.

J. J. Wright, D. D. S., Sec'y.

VERMONT BOARD OF DENTAL EXAMINERS.

The Vermont Board of Dental Examiners hereby give notice that they will meet at the Pavilion Hotel, Montpelier, on Tuesday, July 14th, 1903, at 2 o'clock p. m., for the examination of candidates to practice dentistry. Application blanks, together with rules and instruction to candidates, can be had by applying to the secretary. Applications with the fee, ten dollars, must be filed on or before July 5th, 1903.

St. Johnsbury. Geo. F. Cheney, Secretary.

THE NATIONAL ASSOCIATION DENTAL FACULTIES

Will convene in the ballroom of the Battery Park Hotel, Asheville, N. C., Friday, July 24th, 11 a. m. The Executive Committee is called to meet at same place Thursday, July 23d, 2:30 p. m. All parties having special business with this committee are hereby notified to be on hand at this time.

H. B. Tileston, Chairman,
S. W. Foster, Secretary,
Ex. Com. N. A. D. F.

NEW ORLEANS COLLEGE OF DENTISTRY.

Resignations—Wm. Ernest Walker, D.D.S., M.D., Dean of the Faculty, President of the Board of Directors, Professor of Orthodontia, and Facial Orthopedia, Microscopy, Bacteriology and Clinical Dentistry and Demonstrator of Operative, Orthodontic and Facial Orthopedic Technics; Herman B. Gessner, A.M., M.D., Treasurer of the College and Professor of Anatomy and Surgery, General and Oral; Jules J. Sarrazin, D.D.S., Ex-Dean, Professor of Dental Anatomy, Operative Technics and Operative Dentistry; and Otto Lerch, A.M., M.D., Ph.D., Professor of Physiology, General Pathology and Hygiene, have resigned from the Board of Directors and the Faculty of the New Orleans College of Dentistry.

ILLINOIS STATE DENTAL SOCIETY.

At the 39th annual meeting of the Illinois State Dental Society, held in Bloomington, May 12th to 14th, the following officers were elected: President, F. H. McIntosh, Bloomington; Vice-President, C. C. Corbett, Edwardsville; Secretary, Hart J. Goslee, Chicago; Treasurer, C. N. Johnson, Chicago; Executive Committee, F. B. Noyes, Chicago; Supervisor of Clinics, C. E. Bentley, Chicago; Committee on Science and Literature, G. V. Black, Chicago; Committee on Art and Invention, J. H. Prothero, Chicago; Librarian, J. T. Cummins, Metropolis City; Members of Executive Council, 3 years, A. H. Peck, Chicago; G. W. Dittmar, Chicago, and W. A. Johnston, Peoria. The 40th annual meeting will be held in Peoria the second Tuesday in May, 1904.

HART J. GOSLEE, Secretary.

NEW JERSEY STATE DENTAL SOCIETY.

The 33rd annual meeting will be held at the Auditorium, Asbury Park, commencing at 10 o'clock a. m. Wednesday, July 15th, and continuing the 16th and 17th. Four papers will be read by eminent members of the profession and as with last year's new departure, the clinics will be made a great feature of the meeting. Forty clinicians have signified their promise to be present and the immense floor space at the disposal of the society will be filled with everything new and novel in dentistry. The Columbia Hotel, opposite the Auditorium, will be the headquarters and the rates $2.50 and $3.00 per day. Mark the date off today and come July 15th. You will be made welcome.

F. M. BOGGS,
For Dr. C. A. Meeker.

THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Dental Examiners will meet July 24th, 1903, at Asheville, N. C. The meetings will be held at the Battery Park Hotel, beginning at 10 a. m. and lasting three days.

Compliance with the following resolution passed at Niagara Falls in 1902 is requested:

Resolved, that each Board of Examiners, member of the National Association of Dental Examiners, furnish and present through its representatives, at the annual meeting of 1903, the records and votes of candidates for examination graduates from recognized dental colleges, who have in their examination during the year, and whose marks indicate a lack of proper dental education.

It is important that every state be represented at the meeting, as a number of questions of importance to the dental profession must be settled.

J. P. ROOT, Secretary.

RECENT PATENTS OF INTEREST TO DENTISTS.

723661	Dental cabinet, Daniel A. Evans, Ashley, Pa.
723384	Dental mandrel, Julius Harris, New York, N. Y.

723275 Dental flask, John Hood, Hydepark, Mass.
723710 Dentists' spreading screw elevator, Harry T. McCune, Braddock, Pa.
723546 Dental crown holder, John W. Place, Tuckahoe, N. Y.
723822 Syringe for dental or other uses, Albert E. Buchanan, Indianapolis, Ind.
723998 Dental flask, John H. Feagan, Spartanburg, S. C.
723872 Dental handpiece, Willy Homan, Dusseldorf, Germany.
723942 Dental mold, Willard Streetman, Cleburne, Tex.
724838 Dental appliance, Sidell E. Fish, Greenport, N. Y.
725,033. Dental chair, Isaac N. Brigham, Cleveland, Ohio.
725,081. Toothpick, James E. Hills, New York, N. Y.
725,506. Dental plate, Samuel G. Supplee, New York, N. Y.
726,644. Seamless gold crown for teeth, John R. Comins, Syracuse, N. Y.
726,771. Core for casting molds for tooth caps, Warren M. Sharp, Binghamton, N. Y.
726,772. Device for drawing metal tooth caps, Warren M. Sharp, Binghamton, N. Y.
726,381. Dental bridgework, Victor von Unruh, New York, N. Y.
726,895. Dental mouth mirror attachment, De Witt C. Franklin, Maysville, Ky.
726,956. Artificial tooth, George A. Louque, New Orleans, La.
727,483. Dental mouth mirror, Christopher S. Street, Philadelphia, Pa.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

NATIONAL DENTAL ASSOCIATION.

Following is a partial list of clinics promised for the coming meeting in Asheville, N. C.

An excellent list of papers is being prepared by the various sections. From the preparations that are being made, the coming meeting will be an unusually interesting and profitable one.

L. G. Noel, Pres.

A. H. Peck, Rec. Secy.

Clinics.—Dr. Levi C. Taylor, Hartford, Conn., "Hygienic Fillings"; Dr. S. Eldred Gilbert, Philadelphia, Pa., "Sharp Seamless Crown Outfit"; Dr. R. C. Brophy, Chicago, Ill., "Something in Porcelain Work"; Dr. Garrett Newkirk, Los Angeles, Cal., "Advantages of the Hollow Post Combined with the Inlay Principle for Cantilever and Bridge Abutments"; Dr. D. O. M. Le Cron, St. Louis, Mo., "Modern Porcelain Art, and Oil Colors, as Applied to Dental Prosthesis"; Dr. Wm. H. G. Logan, Chicago, Ill., "Pyorrhea Alveolaris"; Dr. Howard T. Stewart, Memphis, Tenn., "Partial Removal and Decalcification of Cementum in Treatment of Riggs' Disease"; Dr. F. Lee Hollister, Wilkesbarre, Pa., "A Demonstration of the Application of Dr. Edward H. Angle's Fracture Bands in Fractures of Maxillæ, Superior and Inferior"; Dr. Geo. Evans, New York, "The Cementation of Crowns and Bridges with Gutta Percha Cement"; Dr. J. H. Feagan, Spartanburg, S. C., "Demonstrating the Advantages of an Improved Flask in Investing and Packing Vulcanite Dentures"; Dr. Robert J. Cruise, Chicago, Ill., "Administration of Nitrous Oxide with a New Nasal Inhaler"; Edwin C. Blaisdell, D.M.D., Portsmouth, N. H., "The Use of Non-Cohesive Gold"; Dr. Russell Markwell, Galveston, Tex., "Porcelain Crowns"; Dr. Paul W. Evans, Washington, D. C., "Specimens of Porcelain Work and a Method of Making Seamless Gold Shell Crowns"; Dr. F. J. Capon, Toronto, Canada, "Porcelain Crowns, Sections and Inlays"; Dr. Alfred Owre, Minneapolis, Minn., "Cavity Preparation in Natural Teeth"; Dr. Burton Lee Thorpe, St. Louis, Mo., "A Method of Protecting the Cervical Margin in Cement Fillings"; Dr. D. J. McMillen, Kansas City, Mo., "Combination Cohesive and Non-Cohesive Gold"; Dr. H. Herbert Johnson, Macon, Ga., "An Improved Modification of the Richmond Crown"; Dr. R. Ottolengui, New York, "Models and Appliances Representing Artificial Vela and Obturators for Cleft Palate Cases"; Dr. Wm. Leon Ellerbeck, Salt Lake City, Utah, "Porcelain Fillings and Furnace Construction"; Dr. Chas. P. Pruyn, Chicago, Ill., "Root Canal Filling, using Sandarac Varnish and Gold Wire Points"; Dr. Hart J. Goslee, Chicago, Ill., to be announced; Dr. Rudolph Beck, Chicago, Ill., to be announced; Dr. Wm. Reeves, Chicago, Ill., "Porcelain Inlays"; Dr. Joseph Head, Philadelphia, Pa., to be announced; Dr. H. B. Tileston, Louisville, Ky., "Gold Inlay (Using Copper Amalgam Matrix)"; Dr. Harry P. Carlton, San Francisco, Cal., to be announced; Dr. W. A. Capon, Philadelphia, Pa., "Porcelain"; Dr. L. E. Custer, Dayton, Ohio, "Porcelain"; Dr. B. Holly Smith, Baltimore, Md., "Some Novel Attachments for Removable Bridge and Metal Plate Work"; Dr. W. E. Grant, Louisville, Ky., "Abutments for Esthetic Crown and Bridge Work"; Dr. A. R. Begun, Des Moines, Iowa, "Some New Things in Gold Work"; Dr. Emory A. Bryant, Washington, D. C., "Replaceable Facings for Crown and Bridge Work, and Repairs"; Dr. Henry C. Raymond, Detroit, Mich., "Porcelain"; Dr. Geo. W. Schwartz, Chicago, Ill., "Method for Constructing a Continuous Gum, Upper Set of Teeth, Table Clinic"; Dr. C. Edmund Kells, New Orleans, will exhibit models showing his method of extracting impacted third molars; he will also give a demonstration in X-ray work; Dr. Robert E. Payne, New York; "Implantation"; Dr. Wm. K. Slater, Knoxville, Tenn., "Porcelain Work"; Dr. Thos. P. Hinman, Atlanta, Ga., "Porcelain Inlays"; Dr. C. L. Alexander, Charlotte, N. C., "Gold Inlays"; Dr. J. Y. Crawford, Nashville, Tenn., "Oral clinic on the management of children's teeth, also on management of mouths of very aged people."

THE

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ORIGINAL COMMUNICATIONS.

SOME PREDISPOSING FACTORS OF LOCAL INFECTION.*

BY GEO. W. COOK, D.D.S., CHICAGO, ILL.

Respiration is the sum total of the processes by which protoplasm gains oxygen and gets rid of the carbon dioxide it produces as a result of its activity. In the multicellular organism, as in the higher animals, it includes all those processes by which the ultimate elements (cells) of the body gain the oxygen necessary to maintain life phenomena and get rid of the carbon dioxide (C_2) resulting from life phenomena.

In the higher animals special arrangements are necessary for the carrying out of these processes, viz., the organs of respiration. In so far as the work of the special organs of respiration is concerned the processes are *mechanical* and *physical.*

The traches (windpipe), which communicates with the external air through the nose and mouth, divides below into innumerable branches which end in bronchioles, each bronchiole breaks up into several wider passages or infundibula, the walls of which contain pockets or alcoves (alveoli or air-cells).

The walls of the alveoli or air-cells consist essentially of a network of elastic fibres continuous with a similar layer in the infundibula and bronchioles, and is covered on the side next the lumen or outer side by a single layer of large, clear epithelial scales or cells.

The quantity of blood which traverses the lungs bears no relation to the amount required for their actual nourishment. This blood is not derived from the devitalized (?) blood of the right ventricle, but is obtained directly from the aortic system by the bronchial arteries and is returned by the bronchial veins into the systematic venous system. *This blood supply to the lungs has nothing to do with the processes of respiration.* The venous blood sent out from the *right ventricle* through the pulmonary artery, which artery breaks up into innumerable branches, forming a dense capillary network around the alveoli or air-cells, and finally forming the pulmonary veins, has nothing to do with the nourishment of the lung tissue, but is wholly concerned in the act of respiration.

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*Read before the Minnesota State Dental Association.

From this short description of the lungs one can readily understand the *mechanical* part of the organs of respiration. The mechanical part is simply (if it were spread out) a thin membrane consisting of a single layer of epithelial cells on the air side, and a dense capillary network of blood vessels on the inner side, and is simply a mechanical device for bringing the oxygen of the air in contact with a large surface of a diffusible animal membrane.

The *physical* part of respiration consists in the well known physical phenomena of the diffusion of gases whereby gases will pass through animal membranes according to the law of the partial pressure of gases. Here the oxygen of the air passes through the single layer of epithelial cells into the blood, and the CO_2 which is held under pressure by the blood passes in the opposite direction into the alveoli of the lungs. This comprises what is usually called external respiration. $CO_2\ddagger^0$.

Internal respiration, or the interchange of the oxygen taken up by the blood and lymph in the passage through the lungs on the one hand, and the cells of the body on the other hand, is not a physical process, but is more properly a physio-chemical process. Here the cells of the body take up oxygen from the air, not according to any physical law, but a chemical union is formed and gives off CO_2 to the blood, not according to any physical law of diffusion of gases, but according to the laws of the disassociation of chemical compounds. Here comes in a very important, as well as a very complex, biological chemical problem. Oxygen diffuses into the blood and lymph. An unstable chemical compound is formed with the oxygen and the blood proteids called oxy-hemoglobin (HOO).

The cells of the body have the power to disassociate the oxy-hemoglobin (HOO) compound and appropriate the oxygen and leave behind reduced hemoglobin which has the power to unite again with the CO_2 of the cell forming carbon dioxide hemoglobin (CO_2HO). So internal respiration consists of a double chemical reaction between the oxy-hemoglobin of the blood and the cells of the tissues. This action is brought about or stimulated by the "contact action" (Fermentation chemical processes) of the living animal cell. As in all chemical actions an equilibrium is maintained, that is, the chemical reaction never goes on to its ultimate end, but only goes to a certain point where the new chemical compounds formed begin to change the conditions under which the *primary chemical* action began, and thus stop the further progress of the action or cause it to revert to its former condition. This phenomenon is especially common in the chemistry of fermentation, or the chemistry of living organisms which have the power to disassociate chemical compounds. It is no doubt true of all chemical reactions. For example, we might mention the action of diastase in plant physiology. Diastase is a constituent of the germinating part of all seeds. When it comes in contact with starches it produces the following change:

Starch $2(C_6H_{10}O_5)a + aH_2O + \text{Diastase} = aC_{12}H_{22}O_{11}$ maltose.

But all the starch is not changed to maltose or dextrose, only a certain per cent. When the maltose or dextrose accumulates to a certain point it changes the condition of the solution so that the diastase acts no further, and if increased beyond this point it has a tendency to revert to starch again. This is one of the great principles of living chemistry and is so imperfectly understood at present as to render it impossible to express our ideas clearly on the subject.

We shall try to see how the same principles apply to the phenomena of digestion. *Digestion* in the widest sense is the sum total of the processes by which the *foodstuffs,* as taken from the plant and animal, are prepared for absorption and their further *fate* in relation to the chemical changes of the tissues and their excretion as waste products by channels other than the lungs.

In the higher animals we have special organs to carry on external respiration; in like manner we also find special organs for the process of *external digestion.* By external digestion we mean those chemical changes induced in the *foodstuffs* by means of *ferments* or *enzymes* necessary for their absorption or passage into the body proper. The special organ for the carrying out of these processes is the alimentary canal; just as the lungs are the special organs for carrying on the mechanical and physical part of *respiration.*

The alimentary canal is a muscular tube which begins at the mouth and runs under various names, viz., pharynx, oesophagus, stomach, small and large intestines and rectum, and ends at the anus. It communicates with the external world at both ends, and its lumen is in no wise inside of the body.

Body cavity.
Anus. Alimentary canal. Mouth.
Body cavity.

Therefore all chemical changes in the *foodstuffs* which take place in the alimentary canal are outside of the body, hence the term *external digestion.* As the lungs are simply an apparatus to facilitate the interchange of gases between the external air and the internal fluids of the body, so the alimentary canal is simply an apparatus in which such chemical changes in the foodstuffs can be brought about as to facilitate their passage through the intestinal walls into the body proper. These changes are purely chemical and are brought about through the agency of ferments or enzymes. These are bodies found in all plants and animals, which by their presence or contact with other chemical substances are capable of inducing certain chemical changes in the bodies with which they come in contact without themselves being changed. Also the amount of the change is wholly out of proportion to the amount of the enzyme acting, so that a small quantity of the ferment may change a large quantity of the food-stuff acted upon.

Thus we find all along the alimentary canal glands which secrete these enzymes; each different enzyme produces its own specific chemical change. The common action of all these ferments is to disassociate or bring into solution the food-stuffs so that they may pass through the walls of the intestinal canal. For the physical forces, diffusion and osmosis can only act when substances are in solution, and these forces are called into play in the processes of absorption. The first of these enzymes we meet with in the intestinal tract is contained in the secretion of the salivary glands and is called ptyalin. It is a non-organized ferment, i. e., it is the product of living cell, but has no living properties itself. Its specific action is on the food principle commonly called "carbohydrate."

A similar ferment is also secreted by the pancreas and in the enteric juice of the intestines, viz., the maltose, lactose and invertin, all of which have the power to convert starch into maltose and dextrose, in which form the starches are absorbed. The following equations will illustrate the process which is essentially one of hydrolysis:

$(C_6H_{10}O_5)n$ + ptyalin, maltose, lactose or invertin = (Starch) $(C_{12}H_{20}O_{10})54$.

(Insoluble) (Amidulin or soluble starch).

$$\left(\underset{\text{Amidulin or soluble starch.}}{(C_{12}H_{20}O_{10})54 + 3H_2\,O\ \text{(enzymes)}}\right) = 3\left(\underset{\text{erythrodextrin.}}{(C_{12}H_{20}O_{10})17C_{12}H_{12}O_{11}}\right)$$

$$3\left(\underset{\text{Achrodextrin.}}{(C_{12}H_{20}O_{10})17\ \ C_{12}H_{22}O_{11}}\right) + 6H_{20}\ \text{(enzyme)} = 9(C_{12}H_{20}O_{10})5$$

$$C_{12}H_{22}O_{11}$$

$$9(C_{12}H_{20}O_{10})5\ C_{12}H_{22}O_{11} + 45H_{20}\ \text{(enzyme)} = 54C_{12}H_{22}O_{11}\text{Maltose.}$$

All these changes are due to the taking up of water. In the form of maltose all the carbohydrates are taken into the body and appropriated by the cells of the body. It is one of the diffusible forms of sugar.

In like manner the next great food principle is dealt with, viz., the proteids or albumens. The digestion of the albumens takes place in the stomach and small intestines. Here the chemical changes are induced by the pepsin of the gastric juice aided by HCl also of the gastric juice, and the trypsin of the pancreatic juice. The former acts best in an acid media, the latter in an alkaline media. While we cannot trace these changes so accurately as we can the digestion of the carbohydrates, owing to our lack of knowledge of the chemistry of the proteid molecule, the whole change seems to be one of solutions. That is, under the influence of dilute HCl and pepsin, colloids, such as represented in plant and animal proteid matter, are transformed from the solid gelatin state to the semi-solid hydrogelatin and finally to the state of solution. In this latter state they readily pass through the intestinal walls into the body.

If we place some solid fibrin in a 0.2 per cent HCl and add a little pepsin and keep it at a temperature of 40° C. the solid fibrin soon swells up and becomes translucent and then passes into complete solution. The steps seem to be as follows: Albumen, acid albumen, albumoses, and peptones. In the presence of the trypsin of the pancreatic juice the results are the same, viz., peptones, except that trypsin is capable of splitting up the peptone into amido-acids, viz., leucin $C_6H_{11}\ (NH_2)O$ and tyrosin $C_3H_4\ (C_6H_4OH)\ NH_2)O_2$. Here we have the successive steps: Albumen, alkali albumen, albumoses, peptones—(leucin-tyrosin). The chemistry of these two processes, viz., peptic and trypic digestion, is one of electric disassociation of the proteid molecule with the taking up of water in each case. This disassociation is carried on to complete solution or to the peptone stage.

This principle was demonstrated by Hardy, and also by Matthews in their work on the disassociation of colloid cells in the presence of dilute alkali and acid. It is further shown that bacteria have a similar liquefying influence of colloid substance.

The third food principle, viz., fats and oils, are dealt with in like manner by being split up into glycerin and their respective fatty acids and as such pass into the body.

So much for external digestion or the processes by which the body, by means of self-secreted enzymes, reduces the foodstuffs to a state of solution fit for absorption, just as some forms of bacteria reduce gelatin to a state of solution by its enzymotic action.

Internal digestion as in respiration is the interchange between the products of external digestion after they have entered the blood and lymph and the individual cells of the body. The processes here are somewhat the reverse to what take place in the ailmentary tract. In the tissues the liquefied colloids of intestinal digestion are again built up into tissue substance. The maltose and dextrose of the starches are partially stored in the body as glycogen $(C_4H_{10}O_3)n$ and the glycerin and the fatty acids are again united as triglycerites. The parts that are not used to restore body tissues are further broken up into $CO (CH_2)_2$ (urea) and CO_2 as the result of work. So here again, just as in respiration, the interchange results in waste substance which in the case of respiration is CO_2 and in the case of internal digestion $CO\ CH_2)\ NH_3\ CO_2$ and H_2O.

Thus we must conclude that all digestion is a chemical process due to the self-secreted enzymes of the body. No outside agency is necessary.

But such a normal condition of affairs cannot exist. The earth is full of microörganic life. Nature is full of bacteria of all kinds, many of which have a similar chemical action to the animal ferments, i. e., they can split up chemical compounds into various other substances. As for example, certain fungi, as the yeast, can change glucose $C_6H_{12}O_5$ into alcohol C_2H_6OH. $C_6H_{12}O_6+\text{yeast}=2C_2H_5OH+CO_2$. Also by the action of bacteria on solution of carbohydrates, lactic acid is formed, and fats are in a similar manner split up in fatty acids and glycerin. This action on fats is commonly spoken of as butyric acid fermentation. Further, by the action of bacteria on proteid matter, all kinds of ammonia compounds may be formed, some of which are very poisonous, viz., putrocine, cadaverine, tyroleucin, etc. These products are chemical bodies termed ptomaines or toxins.

As the intestinal canal communicates with the external world, it is necessarily more or less full of bacteria, most of which are harmless, but their presence must in part be looked upon as an unavoidable evil which the individual must endure, and the evil effects of which must be contended against. Proteid matter, and especially the products of intestinal proteid digestion, forms a most favorable media for the growth of these bacteria, and consequently for the elaboration of these toxic products. Among the more important and bacterial products in the intestines might be mentioned certain amido-acids, as phenol, indol and skatol and also tyrosin. These are all absorbed and unite with the sulphuric acid of the body and are finally excreted by the kidneys as conjugate sulphate.

Besides these, numerous ammonia compounds may be formed. Also bacteria act upon the fats in the intestine and form certain fatty acids, viz., butyric acid, which is the acid of rancid butter, also lactic and propyonic acids are formed by bacteria in the stomach, and especially in the mouth. All of these are not only unnatural, but also hurtful when absorbed into the body. Aside from the mouth, the large intestine is a most favorable haunt for bacteria which act upon the feces, forming aside from CO_2 and CH_4 many sulphur and phosphorous combinations with nitrogen which also are absorbable.

When noxious gases CO_2, CO_1, NH_3, SO_2, etc., are inhaled by the lungs, they enter the blood and internally act deleteriously on the body cells, upsetting the normal processes of respiration; so also these bacterial intestinal products when absorbed may act in a similar manner on the body cells, hindering the normal processes of internal digestion, and often by their irritating action produce inflammatory changes in the tissues. The symptoms produced by the absorption of these products have been termed auto-intoxication or sickness originating from within. But this conception is a misnomer. If gases of bacterial origin originating in a cellar are inhaled they may cause sickness, but it would hardly be an auto-intoxication; so bacterial decomposition products originating in the intestines and absorbed may, and often do, cause disease, but such a sickness is not from within. Many bacteria form specific products, as, for instance, the lactic or butyric acid bacillus or the bacteria forming indol or phenol. When butyric acid is absorbed it produces specific symptoms, or when phenol is absorbed it also produces a specific set of symptoms, just as the diphtheria germ may invade the throat of a child and elaborate a toxin setting up a specific disease or set of symptoms. Hence we have the specific nature of infection or disease which in all cases is determined by the specific chemical toxines elaborated by the bacterial cause.

The animal body is naturally bacteria-free or sterile. Aside from traumatisms or injuries inflicted by mechanical, chemical or thermal forces, we might define disease as the interchange between the tissue cells on the one hand and the bacterial decomposition products on the other hand, provided the bacterial toxic substances accumulate to such an extent as to hinder the normal interchange of the tissue cell with the normal external digestion products of the self-secreted enzymes. These conditions are general, that is, the body as a whole is acted upon. But secondary to these general abnormal conditions we find many local affections, as local ulceration in the mouth and especially around the teeth. In fact, local lesions very often folow general infection from the alimentary canal. We cannot get around the fact that in biology we have two forces acting, one the normal individual force inherent in the individual by means of which the individual maintains its equilibrium with its external environments. This equilibrium is maintained through the processes of digestion and respiration. All absorbable products not the result of self-secreted zymotic digestion are foreign to the indvidual and necessarily detrimental. Aside from the force necessary for the individual to maintain its equilibrium with its environments, it has a certain reserve force whereby it can rid itself of foreign substances to a certain extent. This is known as the internal body resistance. The second force acting is from without, and constitutes all bodies of whatever origin which the individual is capable of absorbing and which cannot be used to maintain its normal life phenomena. When the second bodies accumulate to such an extent as to preclude the normal amount of the former we have disease, just as if CO_2 would accumulate in the atmosphere to such an extent as to preclude the normal amount of oxygen we would have disease. This second force necessarily changes the tissues of the body so they cannot resist local bacterial action, hence bacteria under normal body conditions may become harmful under the second conditions. First, because of the lowered cell resistance and, second, the cells under abnormal environments form a more favorable media in which to grow. For example, in diabetes we often find a local condition resulting in boils. If it were not for the first condition the second infection could not take place. So in intestinal putrefaction where bacterial products are absorbed we have a foul breath and often local lesions in the mouth, and when the intestinal putrefaction is removed the local affection gets well.

This holds true for all slow local inflammatory processes of specific origin, as ulcerative stomatitis, pyorrhoea alveolaris, etc. In these cases, render the intestinal tract sterile and you have gone far towards curing the local disease.

For instance, take a virulent culture of diphtheria germs and inoculate an individual and diphtheria develops; but reduce the virulence of the bacteria, say 20 per cent, and no disease results. Why? In the former case the toxic powers of the bacteria was 20 per cent greater than the internal resistance of the individual. Now reduce the individual resistance 20 per cent and diphtheria may again develop. It is well known that body fatigue is conducive to infectious diseases. Here the infection remains constant, but the fatigue reduces the internal resistance.

The animal body is in itself sterile, that is, it is normally free from all living organisms. In fact, the secretions of the body are more or less germicidal and antiseptic. We know that the blood serum is quite germicidal and also some of the digestive secretions. The gastric juice possesses marked germicidal properties. But notwithstanding these facts, the alimentary canal, especially the part below the stomach, and more especially the large intestines, are in many respects a favorable habitat for the development of bacteria.

We have seen that the body secretes certain enzymes which disassociate the foodstuffs, viz., carbohydrates, proteids and fats, rendering them capable of absorption and utilization by the tissues. In like manner nearly al microörganic life (bacteria) have an enzymotic action, that is, they also have the properties—either by a secreted enzyme or by cellular contact—of disassociating the foodstuffs, and in fact acting further upon the end products of intestinal digestion, forming chemical compounds which, though absorbable, cannot be appropriated by the body cell for purposes of nutrition. While the action of bacteria in the foodstuff is in many respects analogous to that of the digestive ferments, bacterial action does not stop with the production of substance which the animal can subsequently utilize.

Thus the starches and sugars are not only changed to maltose and dextrose, but are further changed into material in which very little energy remains. Thus glucose $C_6H_{12}O_6$ in contact with bacteria is changed not to maltose ($C_{12}H_{22}O_{11}$), but to alcohol C_2H_5OH and carbonic acid CO_2, and further the alcohol C_2H_5OH, in contact with bacteria, is changed to acetic acid (CH_3COOH). Also glucose $C_6H_{12}O_6$+bacteria may be changed to CH_3 CH (OH) COOH lactic acid. Further, lactic acid may be further changed to butyracic acid.

$$\underbrace{2\ CH_3\ CH\ (OH)\ COOH}_{\text{lactic acid}} = \underbrace{C_3H_7COOH}_{\text{butryic acid.}} + 2CO + 4H$$

Thus we find that the end products of intestinal carbohydrate digestion are maltose and dextrose; the end products of bacterial action are certain fatty acids, viz., acetic, lactic and butyric, none of which can be used by the tissues of the body, either to restore waste tisue or to form energy. They are not only useless, but in a way harmful in that they deprive the body of one of its food principles, just as in the case of replacing the oxygen of the air by CO_2. It deprives the body of oxygen, but some of these acids are poisonous, as for instance, various volatile fatty acids, succinic and the bile acids.

Also as regards albumens. The end product of intestinal digestion is a non-coaglatable albumen—peptone. But as a result of bacterial activity other substances are formed such as amido acids, indol, skatol, phenol, etc., none of which can be used by the body. Thus bacterial action can deprive the body of the albumens so necessary for its nutrition. The fats likewise do not escape bacterial action. As in the case of the steapsin of the pancreatic juice, bacteria can disassociate the neutral fats into glycerin and the corresponding fatty acid, but the bacterial process extends still further and results in a gradual reduction of the higher fatty acids to the lowest forms. Thus we find as a result of bacterial action on palmitic, stasic and oleic acids, butyric and acetic acids formed, which are of no use in the animal economy. Thus we see how bacteria can deprive the body of its normal food principles by replacing the normal products of digestion by products which cannot be used for nutritional purposes.

But aside from these bacterial decomposition products certain specific poisons may be formed which give rise to pathological conditions. These are the products of specific microörganisms and are termed ptomaines or cellular toxins. These bacteria are not the ordinary putrefactive bacteria which are everywhere present, but are the so-called pathogenic bacteria and seem to enter the body at special times and under special conditions.

In Asiatic cholera and also in cases of cystinuria putrescin and cadaverin are found in the intestines, both well known bacterial poisons. Also the Eberth bacillus is a special bacteria which, under certain conditions, may enter the alimentary tract and find a favorable habitation for growth. Here it elaborates its specific proteid toxin, probably from its own cell and not from the media upon which it lives. That is, it does not act directly upon the contents of the intestines, changing albumoses into indol or skatol or other proteid decomposition products, but lives upon the tissues and draws its nourishment from its surrounding proteid media and at the same time secretes its individual special cell toxin, just as a snake lives upon certain food, but does not directly decompose the food into snake venom by its simple contact; as the yeast fungi change grape sugar into alcohol and CO_2, but secretes a specific cellular toxin. Hence we no longer speak of ptomaines, which term primarily was used to designate all poisonous substance found in decomposing proteid matter, but we speak of cellular toxins, meaning a specific poison secreted by a specific bacterium. In this sense the Eberth bacillus, after having gained an entrance into the intestinal canal, secretes its specific cellular toxin which, when absorbed into the body, gives rise to the pathological conditions and symptoms characteristic of typhoid fever. The same is true of diphtheria. The germs do not change the proteid substance of the lymphoid glands in the throat into poisonous substances, but simply live upon these glands and secrete a cellular toxin which produces the local cell coagulation, and, when absorbed, the specific general symptoms characteristic of diphtheria. The same is true of tetanus, anthrax cholera, yellow fever, malaria and is probably true of the specific cause of all diseases. These facts constitute the specific nature of disease. Another biological factor is: Specific cell toxins, when taken into the body in small quantities, gradually render the body immune so that even large quantities of the toxin have no further toxic effect. This is true of snake venom, the poisonous secretion of insects, and in fact, so far as we know, is true of all cell-secreted diseases. Herein lies the so-called self-limitation of infectious diseases. The bacteria secrete their cell toxin which in turn is absorbed into the system and produces its characteristic symptoms. But if the affected individual possesses sufficient vitality to withstand the poison for some time, an immunity begins to develop, and in consequence the poisonous symptoms cease—the disease is self-limited—although the specific bacteria may still remain in the body in the form of non-virulent bacteria.

The first observations made in this direction were that certain albuminous substances found in vegetables were exceedingly poisonous, and also that animals could be rendered immune to these poisons by administering in small but gradually increasing doses. These substances were termed tox-albumens. Two notable examples of the substance are ricin, an intensely poisonous globulin found in the castor bean, and abrin, found in the jequirity bean.

We do not know the chemical nature of this immunity. We simply know the fact that cellular toxins do confer an immunity against themselves, each specific toxin conferring an immunity against itself, but not against other toxins of different specific origin. Thus diphtheria toxin will not confer an immunity against typhoid toxin any more than cobra venom will confer immunity against ricin toxin.

Aside from these acute affections, we have a great variety of local pathological conditions due to microörganisms, such as local abscesses, boils, abscesses in the mouth, especially about the teeth (pyorrhoea alveolaris), local inflammatory conditions around the nails, etc., which are slow in their development, and are always accompanied by certain forms of bacteria. A few notable examples of these are as follows: Actinomycosis, or the ordinary ray-fungi common among cattle. Here we have primarily a local condition due to the development of the ray-fungi in the tissues. Again we have local tubercular abscesses about the joints due to the entrance of the tubercle bacillus, or we may have local abscesses about the roots of the teeth (pyorrhoea alveolaris) seemingly due to the invasion of the tissues by a certain specific bacterium. We could enumerate like cases *ad infinitum.* These latter, primarily local conditions, do not seem to be self-limiting, and seem to make their appearance only under certain conditions.

There is a marked difference between the bacteria in the intestines, which only have the power to act chemically on the foodstuffs, as the lactic, acetic or butyric acid bacilli do, and the bacteria that secrete specific cellular toxins. The former cause the so-called intestinal fermentations, which give rise to the so-called auto-intoxication, which simply means that the intestinal canal has become infested with a great number of fermentative bacteria, and their products being absorbed, produce a set of indefinite symptoms, but do not possess any specific characteristics. Auto-intoxication, according to our present biology of disease, is a misnomer. Poisonous substances formed in the intestines during external digestion are outside of the body, and only exert their influence after absorption into the body, where they hinder the nutritional or metabolic processes of the cell. There can be no such process as cellular intoxication or disease arising from within the cell. Therefore, we shall discard the term auto-intoxication and maintain that all disturbances of cell metabolism originate from without. The derangement of cell activity is only the result of these foreign substances after absorption.

But what effect have these non-specific bacteria, which are so prevalent in the intestinal canal, on the general health of the individual? Neither they nor their products have any power to set up any specific pathological condition. They simply, in the first place, act as food destroyers, and in the second place, their products are in many cases poisonous to the cell. Thus the vitality of the individual is lowered and the cell metabolism is generally depressed so that its chemical changes are not complete.

What effect have these conditions on specific disease-producing bacteria? To say nothing about the very acute infectious diseases, as diphtheria, scarlet fever, typhoid fever, smallpox, etc., all of which are combated by a biological anti-toxin, we have numerous local processes of slower development due to special bacteria which, if confronted by an antitoxin at all, is of little power to self-limit the process. These primarily local processes do not tend to heal spontaneously. We might mention among these the various stoatites, local ulcerations, around the roots of the teeth, local skin diseases due to the various blastomycetes, acne, psoriasis, eczema, etc., all of which we have very good reason to believe are due to specific microörganisms. While we cannot say that all diseases are due to bacteria as a primary cause, we can say that all diseases of which we have any definite knowledge of their primary cause, are due to bacteria or parasites, and we are justified in assuming that all diseases are primarily of like origin. The reason we have not demonstrated this to be true in all cases is not the fault of the bacteria or parasites, but to our lack of methods for finding them.

In this respect we can only note certain facts. We know when intestinal digestion is interfered with by bacteria, local diseases of specific origin are much more prevalent. No dermatologist would think of treating eczema without first putting the intestinal tract in as sterile a condition as possible. No physician of intelligence would attempt to treat a case of anemia, pernicious or secondary, without first looking carefully to the cleansing of the alimentary tract. No dentist would attempt to cure a case of pyorrhoea alveolaris without first seeing that alimentary digestion is interfered with as little as possible.

Facts almost drive us to the conclusion that the greater part of local subacute inflammatory conditions are due to two factors: First—Interference with external digestion as a predisposing cause. Here the tissues become starved and at times poisoned. Second—The entrance of specific microörganisms capable of setting up a specific pathological process. The first simply prepares the way for the second, and when the first is removed, the second more readily succumbs to local antiseptic treatment.

It is often observed that stomatitis develops when the bowels are poor or the patient is suffering from constipation. Also that the stomatitis will persist in spite of all local treatment until the alimentary tract is cleared out, when it readily heals. The same is true of all non-malignant, local ulcers, as boils, rectal abscesses, etc., and of most all of the specific skin diseases. A notable disease might be mentioned in this connection, viz., pernicious anemia. This disease is at present of unknown origin, but is in most all cases accompanied by intestinal trouble—a marked increase in the number of bacteria in the bowels, and an accumulation of these products, amido acids, sulphur compounds, etc. Very often as soon as the bowels are rendered practically aseptic, the blood changes characteristic of the disease disappear.

NEW PHASES OF PULP DIGESTION.*

By A. W. Harlan, A. M., M. D., D. D. S., Chicago, Ill.

I have been a visitor to the city of St. Louis for nearly thirty years, but in all that time I have only read two papers before any of your dental societies, and my appearance this evening is in response to a call for the presentation of somtehing new. If it is not new, it is so nearly new, that I feel it a pleasure as well as a duty to read it to you.

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*Read before the St. Louis Society of Dental Science.

Pulp digestion is not a new thought, as it was presented to our notice as early as 1870; but pulp digestion with the juice of the paw-paw, from the bark of the nearly ripe fruit, is so recent that only a few here and there have used it. My first real paper on this subject was presented in Paris in 1900, before the Third International Dental Congress. Since that time I have found at least three preparations that may be used for pulp digestion, all based on the principle of the paw-paw or Carica Papaya. As early as 1879 papain was isolated as a distinct active principle of the paw-paw—a true vegetable ferment. Much experimentation was indulged in by Peckolt, Bouchut, Wurtz, Chittenden, Finkler and others.

Van Antwerp, of Kentucky, in 1881, was the accidental discoverer of the softening effects of the green leaves of paw-paw on beefsteak, which called my attention to it. As soon as I could get some of the green extract I began to try it, but not with much success. After some years (1891) I began to use it occasionally without glycerin or hydrochloric acid, but in 1895 I began a series of experiments out of the mouth, on the actual pulps of teeth, keeping them at a temperature of between 70 F. and 100 F. I found that a whole pulp would be digested in a single rooted tooth in about three weeks from a single application and that the pulp would melt into a jelly-like mass in three to five weeks in molars.

Finally, after many trials, I worked my formula down to the one I now use, composed of papain, glycerin and hydrochloric acid. Papain will not ferment when mixed with glycerin, and the small quantity of hydrochloric acid added to the paste increases its digestive properties.

The modus operandi of pulp digestion is as follows: The pulp must be devitalized by the use of a corrosive acid or poison. In adults I leave the arsenical paste in the tooth from forty-eight to ninety-six hours. When the dressing is removed, I cut away the bulbous portion of the pulp and wash it with peroxide of hydrogen. I then dry the pulp chamber and slightly moisten it with dilute hydrochloric acid 1 to 300. The cavity is then packed with a papain paste composed of

Papain	gr. v.
Price's pure glycerin......................	minims iv.
1/200 acid hydrochloric....................	minims v.

I place a layer of paper fiber soaked in liquid vaseline over this and seal the cavity with oxyphosphate of zinc or oxysulphate of zinc.

This is left for a period of two weeks in single rooted teeth, or three weeks, in others where there are two or more roots. When the tooth is opened, the pulp will be found to be wholly digested into a jelly-like mass, or it will be so altered or reduced in size that its remains can be washed from the canals with some pyrozone or peroxide of hydrogen, with little or no difficulty.

Time is the important factor in pulp digestion. When you remember the trouble and pain that the removal of dead pulps has caused your patient in the past, you will welcome a method so certain and sure in its results. I know that there are many pulps which can be removed from the roots easily, by the use of local anæsthetics or by the pressure method of anæsthesia, and there are many others easy to remove from the roots with broaches, but also, there are many in bicuspids and molars and even from other teeth where it is not easy to remove them without pain and the expenditure of much time. These are the cases where this method is applicable. Take a superior or inferior molar with two, three or four roots, some of which are not straight, very tortuous and with small openings, what is the prospect of thorough removal of the pulp tissue? You will answer that from some it is impossible to get all of the pulp tissue removed. That is why so many methods of pulp mummification have been proposed. Is there a single one of these methods which can be relied upon for permanency, say for twenty years? Theoretically, yes; but practically, no. It is not customary to surround a mummy with the moisture of animal juices as is proposed in all methods of pulp mummification that I am acquainted with.

I contend that where a pulp is dead it should be removed from the roots of the tooth, so that it cannot be a source of trouble through putrefaction. I contend further, that roots should be filled with some substance that is not permeable by moisture. The only method that you are sure of, for pulp digestion, is by the use of a vegetable ferment. Animal pepsin has been used, but it failed. Taka-diastase is not suited for pulp digestion, as it will only digest starchy matters.

Papain, so far as is known, is the only substance which will act as a digestor in the presence of acids, antiseptics and alkalis. These do not hinder its action. The presence of the ordinary antiseptics and oils will not prevent its action on a dead pulp. Papain will digest a partly putrescent pulp in a few hours, as I have frequently seen. These, as you know, are more easily removed from the roots than those recently devitalized. If I can only interest you sufficiently to try the method of pulp digestion with a papain paste, I am sure you will not regret it. I do not care to cite cases, but I will refer to one to show the advantages of this method. A man of nervous temperament and of sedentary habits, had the pulps of five molars to remove. It was almost impossible to operate for him. After several ineffectual efforts to remove the pulps I concluded to use the papain paste. At the end of five weeks all the roots were thoroughly cleaned and filled with scarcely any trouble and no pain.

One of the peculiarities of the papain treatment of dead pulps is that there is no irritation of the tissues beyond the apex of the root. This is a great boon.

Several manufacturers have been putting out various forms of vegetable ferments. Merck and Lehn and Fink prepare papain; Johnson and Johnson, papoid. The American Ferment Co. prepares caroid, which contains the active principle papain and an extract from "Brassica Oleracea." In my work clinically, I prefer papain. There is no objection to using boric acid with the papain paste. The alcohols should be excluded as well as tannin, lead, corrosive sublimate, nitric acid and the salts of the heavy metals. Any substance that will precipitate (as a tincture) papain must be kept out of a tooth. If the papain paste is changed every day in a tooth, the pulp will be digested in one week, but I prefer leaving it for a longer period, as one-half grain will digest fifty grains of beefsteak when it is heated to 100 F., in half an ounce of distilled water, in one-half hour, provided one drop of hydrochloric acid be added to the above. I have taken pulps away from teeth in two weeks without pain or discomfort by changing the dressing once. All nervous, weak and feeble people are grateful for the results obtained in the removal of pulps by this method, as there is never any shock. Then the digestion is certain and sure, as there cannot by any possibility be any portion of the pulp left in the tooth to putrefy.

This is, as you know, an important factor in subsequent root filling. The absolute removal of pulps from thin, flattened and tortuous root canals has always been the "bete noire" of dental practice. This is rendered easy by digesting pulps in such teeth.

Many authors have written on the uses of papain, papoid, papayotin and caroid, as a vegetable ferment. Indeed, it has been proposed for a variety of purposes in medicine, other than as a ferment. The most notable contributions are by Brunton, Hirsch, Osswald, Rosslach, Culbreth, Martin, Younger, Mendel, Wood, Martindale and Wescott, Lloyd, Oertel, Schaffer, Helbing, Hare, White and others.

The papain should be kept in a dark glass bottle, and I prefer to make a fresh paste every time I use it, as the water and the hydrochloric acid will evaporate. There is no trouble in using papain and I always get as much into the pulp chamber as it will hold, so that the digestion will take place rapidly. Papain will digest blood and pus and blood serum, and there are many conditions where it may be used in the mouth, as in pyorrhoea alveolaris, cancrum oris and other affections of the soft tissues of the mouth, but its chief use, I think, will be for pulp digestion.

PORCELAIN INLAYS.*

By W. T. Reeves, D. D. S., Chicago, Ill.

Mr. President and Members of the Chicago Dental Society:

Inlays are the subject before you this evening. When I was asked by the Chairman of the Program Committee to present a paper on this subject, he informed me that one paper would be upon gold inlays, and I infer from my other associates on the program that the presentation of two methods in porcelain inlays was desired—two kinds, porcelain and gold, and two methods of matrix formation—direct burnishing and the "Ash swaging method."

The writer is at a loss how to present his views without making it a paper of arguments. A whole paper could be filled with arguments pro and con as between kinds and methods. I do not wish to make this a paper of arguments, although some of the points I want to reiterate cannot help but be arguments in favor of kind. What I may say pro and con, I will say later on in the discussion.

During the past year I have written so many papers on this subject (several of which have already been published) that you must all be familiar with my views and statements in favor of porcelain as a tooth saving material, still to pass by without saying anything on this phase of the subject would not be right, and believing that the statements of that eminent writer and worker in this field of work, Dr. N. S. Jenkins, of Dresden, Germany, will carry more conviction than anything I might say, I quote from a paper he read before the American Dental Society of Europe last August:

"Still, notwithstanding so much is already known of the advantages of porcelain work, there remains, and it is right that there should remain, a vast amount of conservatism which hesitates to completely accept the new methods and contiuues to place its trust chiefly in gold. Saint Saens says: 'Intellectually man is an animal that loves the dusk; light frightens him, he must become accustomed to it gradually.' From Harvey and Jenner to Darwin and Lister, and from the fathers of dentistry to Black and Miller, the new light has often had to struggle long before the darkness comprehended it. So far as it does not arise from mental dullness this conservatism is commendable. It is well to 'hold fast that which is good', but it is none the less the duty of those who have found a better way to 'cry aloud and spare not' until the new light prevails.

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*Read before the Chicago Dental Society, February, 1903.

"Once more, then, let me reiterate what is claimed for the new method. Any good operator who has mastered this system can produce esthetic results which before were impossible. He can take a mouth disfigured by decay and fracture and restore it to beauty of form and color so perfectly that the very art of restoration is concealed. He can preserve to years of usefulness frail teeth which would otherwise have to be crowned. He can make crowns of unexampled strength and beauty in well-nigh hopeless situations. He can obtain perfect cervical margins and proximal contours unknown to the most skillful workers of gold, and with a comfort to his patient which excites the warmest gratitude. He can materially increase his income by operations so superior that patients gladly pay the higher fees which this class of work necessitates, and in the conquest and practice of this system he is elevating his profession until it assumes to him and to his patients a new dignity and a hitherto unknown usefulness. The most strenuous objectors are those who have had the least personal experience or the smallest opportunity for observation. I have been often entertained at the complaisant manner in which I have been assured by colleagues whose acquaintance with porcelain restorations was purely theoretical that it was either impossible to make such operations as experts are constantly making in their daily practice, or else that when once made they could by no possibility withstand the force of mastication or permanently preserve the teeth."

A great deal more could be added along these lines, but you are to have two more papers, and there should be a full and free discussion, so I shall try to be as brief as possible.

I want to call your attention to two qualities which porcelain possesses, that have not been fully recognized and that place porcelain first as a tooth-filling material. Ten years ago, when I began the use of porcelain, it was for esthetic reasons; today that is secondary. Time has brought to my attention qualities that porcelain possesses that we little dreamed of; qualities that place it first among all the materials we possess as a tooth-saver. There is no material used in dentistry up to the present time, gold included, that can begin to compare in points of excellency as a tooth-saving material, with porcelain, in all places and under all conditions.

Time will not permit of going over all this ground. Two qualities I must mention that are in themselves argument enough to preclude the serious consideration of gold as a material for inlay making—*compatibility and immunity.*

Compatibility is a quality that no material heretofore used possessed in any appreciable degree, and it is no wonder that with this new material it was overlooked or not recognized, until it was forced upon our attention by repeated good results when little was hoped for. Many of these clinical experiences have been brought forth by inlay workers, in papers and discussions, as arguments in favor of porcelain, without any attempt being made to answer why such results were obtained. These results can all be summed up in one word—*compatibility.* Compatibility of porcelain to tooth structure. Porcelain is compatible to tooth structure to the extent of practically restoring said tooth to a normal condition.

Immunity.—Here I tread on what most of you will think is delicate ground. In 1900 I read before this society the first paper I ever wrote in my life. Then, and on several occasions since, I have been taken to task by those whom we will designate as the conservative men, upon what they please to call positive, radical statements, they claiming to have lived to see the complete reversal of form and thought of many who have made equally positive statements in many lines of work and thought. I have no patience with the man who hedges or straddles upon any subject, that at some future time he may take either side with equal felicity as the case may develop; nor have I any patience with the man who makes positive statements pro or con upon hearsay or through observation of the work of others; but when said statements are well within the clinical experience of the one who makes them, I do not believe they will have to be changed or modified. It does not detract in the least from the truth or strength of a statement, if all others fail, if said statement can be demonstrated by the stater. Up to the present time I have had no occasion to modify or rescind any statements I have made in print. I will pass the quality of immunity without argument, simply making the following statements:

Glazed porcelain is a protection to surrounding tooth surfaces and brings immunity to the extent of about 60 per cent. The tooth that has for contact point the glazed surface of a porcelain restoration is protected to the extent of about 60 to 75 per cent over its original condition. Porcelain inlays or restorations should never be ground on any surface other than the occlusal surfaces of molars and bicuspids and the cutting edge of incisors. It is the glazed surface of porcelain that brings protection and immunity to surrounding and proximating tooth surfaces.

I want to bring to your attention a method of color selecting for inlays, and how to handle bodies to produce the color effect desired. The colors in a tooth are underlying colors, and it is these you want to look for. It will surprise you when you look at a tooth in this way, what a variety of colors you will find. At first you may not be able to see all the colors there are, but a little close observation and practice along these lines will develop you wonderfully, and in a short time you will perceive colors that at first escaped your attention entirely, and it is just in proportion as you can see these colors and then are able to reproduce them in the inlay, that you will be successful in matching inlay to tooth. The shade guide furnished with each outfit of bodies should not be used as you would the tooth guide in selecting a facing for a crown. The majority of teeth are of such color that one of the yellows seems to be a perfect match, but an inlay built all of that body would not match the tooth at all, because of underlying colors and the gradation of shade from neck of tooth to cutting edge. If you see yellow, gray, blue, etc., hold those colors of the shade guide to the tooth to confirm your observation and to determine the strength of the colors seen, or to show your error. It is by comparison you are able to determine the variety and strength of colors in a tooth. For example, take a typical light yellow tooth; at the neck the yellow will be stronger, the middle third will have a tinge of gray in the yellow, and the lower third a blue-gray effect; in fact, there is very little yellow in the lower third. You want those colors in the same relative positions in the inlay in order to have a match of inlay to tooth.

To handle bodies so as to produce these effects you want to build up in layers; in this way you can put your colors just where you want them. Never mix two or more bodies together in order to vary the shade of any. You can get any shade of any color by the thickness of the layer you put on, baking each layer as you build it on. Building in layers accomplishes three objects—translucency, avoidance of shadow and reducing the effect of the cement the inlay is set with to the minimum. Building on your colors and allowing them to reflect through an overlying layer that is neutral or enamel color gives you the translucency so desirable, and it is the only way that you can produce a translucent natural looking inlay. Building in layers breaks up light absorption and refraction so that the inlay will look 95 per cent the same from whatever point of view. Building in layers prevents, on the same principle, the cement showing from underneath.

My method of burnishing I gave in the paper I read before this Society in December, 1900, and published in THE DENTAL REVIEW, March, 1901. It is the same as I am doing today, so I will not take your time by going over burnishing again. I have followed this method now for about seven years, and I have never found it necessary to go back to the tooth and reburnish after havnig baked in a portion of body in the matrix.

In all my experience I have never met with a cavity that I was not able to burnish platinum to form a matrix and obtain a perfect fit, and I make inlays for all kinds of cavities in all places on all teeth.

Two points I cannot refrain from mentioning that are in favor of burnishing as against swaging. You can burnish a matrix in the cavity in about the same time as it will take to get a good impression in cement, and you are ready to proced at once with the baking of the inlay. Second, it must be apparent to anyone that more accurate results can be obtained by working upon the original than upon a model, twice removed from the original. The most enthusiastic swager I do not believe would claim as good results could be obtained from an impression and model from their original model as would result from the original model, and I believe the same holds good as between working from a model and upon the original cavity. Burnishing into the cavity by methods that are known to give accurate results I believe to be the perfection of matrix formation.

PORCELAIN INLAYS.*

By C. N. Thompson, D. D. S., Chicago, Ill.

My knowledge of the low-fusing bodies is limited to a short experience, first with the Downie and later with the Jenkins enamel bodies, neither proving satisfactory or permanent. It is said, however, that the Jenkins porcelain has been very much improved recently and has some advocates. My experience with it, and what I have been able to see since, leads me to say that I doubt its value as compared with the high-fusing porcelain for the following reasons:

I consider that it is impractical to attempt contour fillings with any inlay body which has not as a part of itself, several good higher-fusing foundations, or dentine body colors, with which to start and outline a filling, and which will not, thereafter, fuse or change form during the process of fusing the color bodies and enamel upon it. Again, their tendency to assume a globular form when fused frequently necessitates grinding the filling after it is set, which is objectionable.

Again, owing to the extreme pliability of the material used for matrix, it is necessary to invest before applying the body powder. This admits of the possibility of mixing particles of the investment with the porcelain during carving; it also requires time and partially conceals the tooth outlines which should be in view as a guide in shaping the filling.

Again, I doubt if there is any investment material in use which does not change form while exposed to the heat that accompanies the fusing process; thereby disturbing and unseating the matrix, if nothing more.

Gold as a matrix is perhaps somewhat more easily burnished to place than platinum, but, as might be expected, the property which makes this difference is its greatest frailty when out of the cavity, being so easily injured or bent.

HIGH-FUSING PORCELAIN.

My experience in the use of high-fusing bodies in inlay work extends over a period of several years, steadily increasing their use as manipulative skill and perfection of materials increased their permanency, until now I use them almost entirely in the anterior teeth and in all cavities in the posterior teeth not exposed to severe masticating strains. I am not enthusiastic enough, however, to go the length of recommending them in all cases, and desire to call attention to some of their frailties and advise a conservative use of them when they are to be exposed to direct occlusion.

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*Read before the Chicago Dental Society, February, 1903.

We know that thin, unprotected porcelain, either as a filling, facing or crown, will not stand the force of mastication, owing to its great friability or brittleness; then why depend upon it as a filling in exposed places in posterior teeth, when it is possible to use a material that is so easily inserted for both operator and patient; gives almost as perfect protection against thermal action; that has no peer as to wearing and protective properties; can be inserted in about the same length of time; admits of beveled margins in cavity preparation and is finished when it is set. I call your attention to the gold inlay.

I do not want to be understood as advocating the use of gold inlays to the exclusion of porcelain, but I do desire to urge conservatism in the us of porcelain inlays in all cavities which are exposed to severe strains, unless their well known resistance to thermal change, combined with their esthetic effect, overshadows their frailties.

The frailties of porcelain as a filling can be summed up as follows: The bodies in use are no stronger than tooth enamel, as is shown by our cavity and filling margin preparation, where perpendicular walls standing pressed together with cement between is considered the strongest procedure. Similar marginal preparations for any other permanent filling would not be considered practical because of the probability of chipping enamel. Now, if rounded margins are desirable because of the tendency of enamel to fracture, when sharp, is not porcelain frail as a filling because of the cavity preparation necessary for its use, if for no other reason?

Cracks or checks in porcelain fillings are more common than is generally supposed. This is due to unequal shrinkage when bodies of different density are used, or from hurried or careless cooling, but is not a frailty if it can be prevented, though in the hands of a beginner it is quite a factor in his failures.

The cements are improving rapidly, but in them lies one of the most common causes of failure; not so much, perhaps, from lack of strength, as because of its tendency to disintegrate. The main reason for this is that the powders supplied are very coarse, and it is impossible to bring the inlay closer to the tooth than the thickness of a layer of the particles of the powder used because if more of the powder were excluded there would be no union, consequently no strength. The frailty here exists in the fact that all cements disintegrate some and when coarse powder is used it leaves a broad line between tooth and filling, which when exposed to extreme wear, as on the occlusal surfaces of posterior teeth, soon wears down a little. Then from lack of marginal support the filling or tooth—possibly both—begin to chip or crumble. This opens the way for more wear on the cement, which in turn leaves new opportunities for chipping and so on to failure. This applies only to cavity margins on occlusal surfaces, for in cavities not exposed to masticating wear we find that for some reason the cement disintegrates at first a very little and thereafter does not. Fillings of this kind inserted five or more years ago have not changed appreciably after the first year.

In commenting on the technical procedure for the insertion of porcelain inlays I desire to belittle the difficulties which are continually held up as next to insurmountable. In my opinion there are but few who could not master completely the insertion of even difficult fillings if they would spend the same length of time for it that they give to any other branch of dentistry. It is no wonder that those who have had no instruction or laboratory experience in filling cavities in extracted teeth should fail, and it is but natural that those not skilled should feel doubtful after what has been printed relative to their unreliability.

Therefore, to those who are still skeptical as to the value of porcelain as a filling material, let me say that in my opinion when properly inserted in cavities such as good judgment would elect, there is no other filling that proves so permanent and comfortable.

Time alone proves, and although this process has not yet been in use long enough for us to determine how and where they fail at last, we still want to know of the past, even if it is short. Porcelain fillings that were inserted longer than twelve or fourteen years ago were probably made by grinding a portion of a porcelain tooth of the right color until it was considered a fit, and then set in cement. It was my fortune to examine several such, recently, and they were doing good service. I know of two others which were inserted in the very early days of platinum burnishing for matrix. They are in perfect condition and about the only sound fillings remaining.

My experience leads me to say that for labial, proximal, buccal and lingual cavities, or any possible combination of them, porcelain has no equal, and can be depended upon to protect against further attack of decay better than any other filling material. If properly made, it can be recommended for no better reason than that it will last longer.

The process of making and inserting porcelain fillings is best divided into four steps. Cavity preparation, annealing and burnishing matrix, carving, shading and fusing, and cementing to place.

Of cavity preparation in the light of what has been written by men known to be competent I deem it unnecessary to go into detailed description, further than to say that our knowledge of cavity and margin preparation for metal fillings stands in the way of most beginners, because, being accustomed to having the metal filling overlap and protect rounded margins, it is hard to fully grasp the idea of cavities with no undercuts and sharp margins, such as are always necessary for porcelain.

It is my custom to prepare cavities for porcelain regardless of outline provided that all caries are excavated, sufficient depth secured, and frail or discolored enamel removed. I encourage the practice of making zigzag or crooked margins in cavities exposed to view, for aside from the fact that they are a little more difficult to fit they present a broken outline which is far less conspicuous than one made straight. Margin preparation is the same for all cavities, that is, the cavity wall as it approaches the orifice shall be ground to a slightly diverging right angle to the near-by outer surface of the tooth. For this use small fine stones, so rotated that they cut against the corner, turning into cavity to prevent chipping.

In preparing inciso-proximal cavities the lingual plate should be cut back laterally if possible, more than the labial, because incisal strains are usually upward and outward. The labial wall thus supports the filling, particularly when first set. It also gives more surface for cement attachment between cavity and filling. Then, too, it presents an oblique line across the incisal edge which in most cases diminishes frail corners and partially removes the chances of incisal splitting strains.

In proximo-occlusal cavities where for sufficient reason a porcelain filling is required in either bicuspid or molar, it is my practice, if at all possible, to restore the entire occlusal surface, thereby removing all margins outside of and beyond the reach of masticating strains. I consider that to allow any cavity or filling margin near to or across any cusp or grinding surface is likely to prove disastrous.

Labial and buccal cavities should, if possible, be extended under gingival border because it is difficult to match inlay accurately close to the gum. Very broad and shallow cavities should be avoided because it is difficult to manipulate against cement showing through, as well as the tendency it has to pack between flat surface.

The technique of burnishing platinum can best be divided into five steps.

I. Secure a piece of well annealed platinum foil, one one-thousandth of an inch thick, amply large to cover cavity, and lap well onto the tooth. Gently press it to place, using small ropes of bibulous paper, continuing only until foil begins to double or buckle upon itself at the margins, because to proceed farther would produce folds impossible to work out later.

II. With the partially filled matrix in place, carefully adjust over it a piece of tape, wide enough to more than cover the whole tooth and draw it tight, through and over this burnished matrix, both inside of the cavity and out, until certain that it will be flat everywhere.

III. Holding the foil to the tooth with the fingers grasping the overlap, burnish every part of it to the cavity and tooth, absolutely working out kinks, wrinkles or folds, securing a perfect cavity margin outline in the matrix.

IV. Remove matrix from cavity and trim the excess so that it will set fair and flat, while in the furnace, thereby preventing warping from its own weight when white hot.

V. Replace it in cavity carefully, secure strip of strong rubber dam, adjust it over matrix and draw tight so that it will be possible to see that every part of the matrix is down—the rubber holding it at every point—for a thorough final burnish.

CARVING AND PLACING COLORS.

With a pair of fine pointed locking tweezers secure the finished matrix at a point some distance from margin. Select foundation color required, mix it with sufficient water to make it easily worked without running or spreading, and build to duplicate lost dentine, allowing for shrinkage; carve body flush with lingual cavity outline, leave room on the labial for the colors and enamel, and fuse. If outline is satisfactory add colors necessary to produce desired effect, allowing the yellows and browns, which are usually used near the neck or cervical part, to meet and blend with the blues or grays generally required for the tip and fuse. Then over all fuse a lower fusing enamel color. In allowing for shrinkage a great deal depends upon the density of the body powder before being fused, but when well packed it is usually about one-fifth. Many failures can be avoided by taking time to allow the body to dry after carving. Sudden heat turns moisture to steam, causing bulging, cracks, etc.

SETTING FILLING.

This is as the keystone to an arch, because, no matter how well the cavity is prepared, the filling fitted, shaded and fused, all are of no avail unless secured in place.

Absolute dryness and cleanliness in all details is necessary, which means that in addition to the adjustment of rubber dam the cavity shall be dehydrated, and both it and the filling be perfectly clean, for it is possible to so soil either in handling that cement will not adhere to them.

Unless the filling fits the cavity accurately the probabilities of permanency are greatly reduced even though the marginal fit is good, for the less cement required in the space betwen them, the stronger it holds.

The best surface to give porcelain for the cement to adhere to is produced by the use of Hydrofluoric acid, being careful to cover those parts not to be etched, with wax, to protect it, wash and clean well before setting, using chloroform to remove any possible bits of wax or oily substance.

I secure the best results from the use of the Harvard cement, but believe there is much in its manipulation to secure full strength, My process is to use a broad, strong, wooden (hickory) spatula, and with rapid motion and good pressure work powder into liquid, attempting to pulverize powder fine, continuing until it becomes a little sticky or heavy. Then quickly paint both cavity and filling, press to place, using good firm pressure until thirty minutes afterward, keeping it perfectly dry.

Now that I have spoken of gold inlays I desire to say that owing to the beveled cavity margin preparation possible, I believe that they will outlast porcelain in exposed places, for, admitting that cement does disintegrate or wear from all margins, leaving the filling unsupported at that point, the stress of mastication quickly forces the thin edges of the gold down onto the tooth, hermetically sealing it. This is not so with porcelain.

I use a great many gold inlays in molars and bicuspids and have for many years. I have also examined a great many, which were inserted more than twenty years ago, and it is my opinion that for large fillings in posterior occlusal cavities, particularly if the teeth are pulpless, gold inlays prove the most permanent of any filling in use.

INLAYS.*

By J. W. Wassall, M. D., D.D.S., Chicago, Ill.

The older men present will easily recall the time when extracting forceps were kept in the most convenient and accessible part of the operating cabinet. Probably very few here this evening own tooth extracting instruments now, or if so, they are scattered in the laboratory to be used for any purpose but for that which they were made.

This relegation of the forceps to the junk-box marked the change from destructive to conservative practice in dental history. Within the last two or three years another change has begun to take place; gold plugging instruments are being removed from their long accustomed place to make room for other newer and more frequently required instruments. Is the gold plugger doomed to become as obsolete as the extracting forceps becomes a question that is interesting.

To the minds of quite a considerable and a constantly growing number of practitioners the answer is already in the affirmative. This conclusion is based on experimentation and observation extending back twenty years or more. But above all this conviction is forced by the contemplation of the marvelous qualities of the inlaid fillings which have been made in the very recent years, and are actually under our eyes. The object of this paper tonight is briefly to set forth some of the advantages of the newer method, contrasting them with the disadvantages of older methods.

All processes of making so-called permanent fillings for restoration of lost tooth tissue may be divided for our purpose tonight into two classes. First, those which are retained in the cavity by some form of under-cut anchorage, and second, those which are retained in place by the adhesive property or stickiness of a cement. In considering the relative merits of those two classes, the question arises, Is there any inherent weakness in the filling which is retained by the old method of anchorage made by pits and grooves or by the general shape of cavity which is absent from an inlaid filling?

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*Read before the Chicago Dental Society, February, 1903.

I have dwelt on this subject in another paper recently read, but it is a matter of so much importance that I desire to repeat and amplify somewhat. It becomes evident at once that the chief value of any filling must rest entirely upon its decay preventing properties.

Every gold filling made in the ordinary way has a point or space where the filling and cavity-wall meet. This joint or space generally varies in extent according to the skill and thoroughness with which the gold has been adapted to the cavity wall by the operator who made the filling, and it also is subject to change according to the temperature of the metallic filling material at a given time; but that there is a space between the tooth and filling at all points, no matter how well margins and cavity walls were prepared or how thoroughly the gold is condensed and adapted, or whether cohesive or non-cohesive gold was used, cannot be denied. That open joint exists. It may be microscopical, but it is always capable of being demonstrated and measured. This space is the vulnerable point in all the old filling operations. In mouths subject to the lactic acid fermentation and others of the bacteriological growths, the "inter-dento-filling" joint, if I may be allowed to coin a term, is the starting point for secondary caries.

Is it not a fact that the principal defects which we have to correct in the mouths of persons who have reached the age of twenty consist of the repair or the replacement of gold fillings made at some earlier period, the majority of which we will admit for argument's sake were perfect when made from the operator's standpoint? Does this, if true, not prove the fearful inadequacy of the conventional gold filling operation? The gold filling has been of inestimable advantage to humanity, but it has served its purpose and must now yield to superior decay-averting attributes of the cemented filling—the filling with the closed joint.

The adoption of inlay work involves certain changes of method in cavity preparation. It may require some little time to formulate and establish rules for this step of the operation; rules which can be accepted as sufficiently final to be taught as safe practice. For the present every man is a law unto himself. Of course the general principles of cavity formation apply, modifications being rendered necessary by the need of making a matrix or impression. Meanwhile it will be valuable to those who are working at the subject if each will from time to time set forth his ideas and his method of work as he goes on, because new thoughts and ideas are constantly occurring to the ingenious man. If it were possible for us here tonight to be told what each other man who is doing inlay work has learned through his own experience, there is no doubt but we should be far upon the road to settle upon a reliable system of practice.

Many points in the operative procedure could be brought out. The use of chisels in opening cavities, the different uses of disks, corundum, carborundum and gem stones, diamond points, cavity trimmers of all kinds, spoon excavators, etc. The merits of all such instruments as used by different men could not fail to be a subject of vital interest and benefit to each of us.

Then again such questions as to what extent we are justified in removing adjoining fillings, presuming of course they are not defective? What are the liabilities to accidental exposure of the pulp? To what extent are fissures in molars and bicuspids to be opened? What is the practice in regard to preparatory separations? Parenthetically I may remark that herein lies one of the greatest benefits in inlay work. Contouring may be carried to its perfection. The normal "V" shaped interproximal space may be absolutely restored. Consider the boon to suffering humanity in the fact that they are spared the polishing of proximal surfaces; consider also the injury to the gingival margins in the past from sandpaper disks and polishing strips. Much also would be learned from the experience of different men in setting inlays. What are the relative merits of the different cements? How is the mix made? Where two inlays are to be set in a proximal space is it the custom to set both inlays with one mix or to set them seperately? In what cases should one inlay at a time be set and in what cases may both be set with one mix? Is there any advantage in making pressure upon the inlay while the cement is hardening, or is it desirable to protect it from moisture for a time after the inlay is cemented?

The accidental dislodgment of an inlay is due to three causes; Too much occlusion; defective formation of cavity; imperfect cementation; the latter may be due to poor quality of cement, mixing cement too thick or too thin, or casual moisture in the cavity at the time of setting.

It is my own practice still to make the platinum matrix from a cast of the cavity instead of from the actual tooth cavity. By this method it is, in my opinion, possible to make a more perfect inlay with less expenditure of my patient's and my own time.

The advent of porcelain for restoring lost or defective teeth puts the operative branch of dental practice upon a higher footing. The spending of hours and hours of every work-day in condensing gold, piece by piece, we maintain, is not an ennobling occupation. It dullens and fatigues the brain and senses. Is it not an immense relief to find a way to supply lost tooth tissue, no matter how extensive, by the application of masses of porcelain and by the employment of a beautiful handicraft? Surely some of the chains of our bondage are struck off. The purely craftmanship department of our calling is lifted to a higher plane, the ideal filling is more nearly attained and to that extent dentistry is become more alluring as a vocation.

Two or three years of active experience does not afford a large retrospect, but we do every now and then have an opportunity of examining operations which were completed from one to three and four years ago. While there are many inlays which we would have better, we are bound to say all are almost without exception to be preferred to fillings made by the old way.

Examination of the older operations in inlay work has its lessons. I plead guilty to having occasionally inserted an inlay for various reasons which were potent at the time, which I knew very well might have been improved upon by a second trial. A second or even third making over, perhaps a change in the cavity formation in each case, fully repays the trouble by promoting sweeter dreams, and engendering the sense of duty well done, and I need not mention the chagrin of meeting your own horrors—for horrors they become—when you or your confreres meet them in after years.

In the mouths of children and youths the inlaid fillings, either of gold or porcelain, seem to be especially applicable. Sufficient time has not elapsed as yet to furnish conclusive evidence of their efficiency in preventing the recurrence of caries which so often follows gold fillings made at an early age, but the method seems to give assurance of a greater immunity than we have been accustomed to see.

TEACHING PHYSICAL DIAGNOSIS.*

By J. M. Patton, M. D., Chicago.

Mr. President and Gentlemen:

The invitation to present to this association a paper on the teaching of physical diagnosis to dental students brought to my notice two features pertaining to this subject which, while not unrecognized, yet had hitherto been not fully appreciated. These features are the absence, until a comparatively recent date, from the curricula of dental schools of any instruction in physical diagnosis in its relation to the administration of anesthetics, and the fact that in some quarters there has been manifested a spirit of cynical doubt as to the advisability or practical utility of introducing this branch of medical learning into dental pedagogics.

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*Read before the Institute of Dental Pedagogics.

The recent introduction of instruction in diagnosis into the course of dental schools is but one of the evidences of advancement along the lines of a more general and thorough education for dental students which marks the educational methods of to-day, others of which are the courses in physiology, chemistry, anatomy, and bacteriology. Some of these are of comparatively recent introduction, and the previous apathy relative to the teaching of physical diagnosis in dental schools is to be charged against the same lack of recognition of its relative importance to the administration of anesthetics as has hitherto marked the general medical profession in regard to the employment of skilled anesthetics who have some knowledge of the physical conditions and physiologic possibilities of the organs within the chest, relations which the medical profession are but now coming to fully appreciate.

Regarding the propriety of teaching physical diagnosis to dental students there appears to me to be but one conclusion, and that is that it is not only proper but absolutely necessary, if we are to educate dentists who are capable of not only administering an anaesthetic properly, but who also have some judgment as to the propriety of its administration in the individual instance.

There are those who maintain that the latter faculty is beyond the possibilities of an education in dentistry, and is not a legitimate feature of dental practice. I am not here to controvert special argument, but, to quote Milton, "Ink doubtless, rightly applied with some gall in it, may prove good to heal this tetter of pedagogism."

Two questions arise in this connection: First, what necessity has a dentist for a knowledge of physical diagnosis? Second, to what extent is it necessary or advisable for him to carry this study?

An affirmative answer to the first of these questions hardly needs argument in its support. If the clientele of the dentist of to-day exhibited the characteristics of that old Countess of Desmond who, as related in Bacon's natural history, "lived till she was seven score, did dentize twice or thrice, casting her old teeth, and others coming in their place," it is probable that I would not be imposing myself at this time on this association. However, as modern life is not conducive to senile dentition, we must expect the painful features of dentistry to endure. We must not expect that the modern tendency to specialize in the field of anæsthetization for dental purposes will obviate the necessity for direct and correlated knowledge of anæsthesia on the part of the general practitioner of dentistry. It is not always possible to utilize special services, and even if it were it does not entirely eliminate the responsibility of the practitioner to his patient in this connection, which calls for the exercise of his individual judgment irrespective of his personal conduction of the anæsthesia. We might here paraphrase Sir Thomas Browne to the effect that "they do most with anæsthetics who could do much without them." Because a dentist does not extract he is therefore not relieved of all responsibility to his patient in regard to the employment, by some one else, of anæsthetics for extraction.

Admitting the necessity of the administration of anæsthetics by dental practitioners, the importance of a knowledge of not only the physiology of the organs of respiration and circulation, but also of the evidences of abnormal conditions of these organs, especially as far as they relate to the administration of anæsthetics, is self-evident. To minimize or deny this importance is to acknowledge a want of appreciation of the principles which to-day govern the administration of anæsthetics. These principles embody not only a knowledge of the chemical nature of these agents and of their physiologic effects but also of those physical conditions of the chest and its contained organs, as well as conditions of the kidneys, blood, and general health as may modify the physiologic effects of anæsthetics, and materially affect the extent or method of their administration.

Sentiment alone, though having no place in scientific study, has sufficient historical relation to this subject to justify a more thorough education of dental students in this branch. Who discovered the practical utility of anæsthetics? Morton, a dentist. What manner of man was he who seized opportunity, presenting in the form of Eben Frost with a painful molar, to demonstrate that though the nepenthe of Homer might be mythical "science has control of pain"? Morton, a dentist. For without discussing the claims of any one to the right of discovery of anæsthesia we may quote Sidney Smith to the effect that "He is not the inventor who first says the thing, but he who says it so long, loud and clear that he compels mankind to hear him." In this sense at least Morton's title is clear and supersedes the earlier observations of Wells. Did he not succeed where the latter failed, at the same place and before practically the same audience rendered cynically antagonistic because of the previous failure? Thus the historical interest associated with this subject gives every true dentist an incentive for the study of conditions allied to the administration of anæsthetics.

The principal questions of interest in this connection are, however, To what extent shall physical diagnosis be taught to students of dentistry? and How shall this study be carried uot?

It has been maintained that because of the impossibility of giving thorough, practical courses in physical diagnosis in dental schools to students who have no knowledge of the pathological changes upon which physical evidences of disease depend, therefore it is unnecessary and impracticable to teach physical diagnosis at all. This is shallow argument. Is the bacteriology taught in your schools useless because you do not make expert laboratory workers of your students, and fit them for original research? Is the physiology taught in your schools useless because you may not teach the chemico-physiologic relations between metabolic processes and the so-called xanthin or purin bodies? Not at all. Neither is it necessary that a dental student should be taught the histo-pathology of diseases of the chest in order to appreciate certain facts about such conditions that relate directly to the administration of anæsthetics. We should not expect to make expert diagnosticians of dental students. For him the differntial diagnosis of complicated heart lesions is unnecessary. The soundness of his judgment as to the nature of a pleural inflammation does not enter into the matter. His ability to locate a cavity in the lung is beside the question.

I do not mean that these conditions are of no interest in this connection, but that their proper interpretation demands a degree of skill not to be required of a dentist, any more than you would expect technical knowledge of prosthetic dentistry of a physician before allowing him to decide as to the necessity of treating a tooth cavity.

As far as the heart is concerned in its relations to the administration of anæsthetics, leaving out of the question reflex or other inhibition of apparently healthy hearts and confining my remarks to judgment based on objective examination, the whole matter rests on the integrity of the heart muscle, and not in the mere presence of arrhythmia or of valvular lesion, a matter in which reliable judgment postulates most extensive experience and observation. Even marked degrees of hypertrophy and dilatation may not contraindicate the administration of anæsthetics provided the muscle be fairly good. It is obvious that even the most expert may be deceived, and the behavior, under anæsthesia, of some hearts that give every evidence of muscular degeneration and cause us to dread the necessity of anæsthesia, is often surprising.

We should not expect to teach dental students to become expert in judging such cases, but they may be taught the recognition of physical signs that will present to them either the absence of dangerous elements, or the presence of such conditions as render it advisable to divide the responsibility of the administration. I have examined patients who had been told both by physicians and dentists that they could not be given any kind of an anæsthetic safely, and in whom no contraindication to such administration could be found. Upon the other hand, I have examined patients who had taken an anæsthetic without preliminary physical examination, and in whom prolonged or profound anæsthesia would certainly be dangerous.

Having acquired an understanding of the gross anatomy and the essential physiology of the organs of the chest, the physiology of the blood, together with a knowledge of the physics of the diffusion of air in the lungs and the interchange of gases with the blood, essential knowledge in which, I am afraid, the average senior dental student is deficient, the student is then fitted to study physical diagnosis in its relations to the administration of anæsthetics.

He should now be taught the normal character of the heart rhythm and sounds, the characteristics of the normal pulse, the features of normal lung action and its respiratory murmur. This preliminary instruction in the normal physical signs is a very much neglected study even in medical schools.

Having acquired this knowledge, the student should then be taught the main diagnostic features of a cardiac murmur, how, when, and where to detect it. The differential diagnosis need not be considered. The nature of cardiac enlargement, hypertrophy and dilatation, and its relation to the signs of displaced apex beat, and increase in the area and force of impulse should be considered. The modifications of the normal heart sounds caused by disease should be studied, as should also pulse changes and their relation to dynamic ability of the heart. Abnormal conditions of the lungs and pleura should be considered as far as they relate to modification of respiratory capacity and obstruction of the air passages, chiefly in relation to the signs obtained by auscultation. Expertness in palpation and percussion is not essential.

The general features of blood conditions which result in degrees of anæmia which may prohibit the exhibition of anæsthetics should be considered.

The principal elements of urinary diagnosis should be taught in relation to the detection of the possible presence of kidney lesions, at least as far as chemical analysis as ordinarily taught for this purpose is concerned.

As to the general method of instruction in physical diagnosis, there is only one practical way, and that is by actual demonstration on subjects. More actual knowledge can be obtained in this way in one hour of work than in many hours of didactic instruction.

Every student should have opportunity for objective study. This method necessitates demonstration to small classes or sections, and the ground outlined can be covered in a series of from eight to ten demonstrations, and should be supplemented by quizzes in order to bring out and correct the individual students' errors.

Such a course of instruction will enable the student to obtain from his course on general anæsthesia much information which must otherwise have fallen on stony ground. Information which will be of immense practical value to him in his professional work, not only to enable him to administer anæsthetics with greater skill and efficiency, but which will also enable him to judge when it is necessary or advisable, on behalf of both himself and his patient, to obtain additional advice in relation to the possible danger of the administration of an anæsthetic.

The fact that the principal dangers, fatal and otherwise, attending the administration of anæsthetics, are of asphyxial or circulatory origin, emphasizes the importance of a knowledge of physical diagnosis on the part of the administrator of anæsthetics, for while such knowledge may not prevent the fatalities resulting from anæsthetics, all of which are not preceded by evidences calling attention to their imminence, nevertheless observation of and attention to the evidence obtained through a proper physical examination may do much to lessen both the frequency and the dangers of the various complications which are liable to arise during the administration of anæsthetics, and to some extent may affect the frequency of serious consequences arising therefrom.

The teaching of physical diagnosis in dental schools is already a fact. This cavity in the dental curriculum is being filled with golden knowledge. The students want it, and are capable of assimilating it. It has come to stay.

I desire, Mr. President and Gentlemen, to acknowledge the courtesy of this occasion, and to thank you for the attention which you have given to a paper which by no means equals in interest the subject with which it deals.

PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

A regular meeting was held Feb. 3, 1903, with the President, Dr. Elgin MaWhinney, in the Chair.

Dr. W. T. Reeves read a paper on "Porcelain Inlays."

Dr. C. N. Thompson read a paper on "Porcelain Inlays."

Dr. J. W. Wassall read a paper on "Inlays."

These three papers were discussed jointly.

DISCUSSION.

Dr. J. S. Bridges:

All of us appreciate the very interesting papers that have been presented this evening, and if we could follow out as many of the points as have been brought out, we would have many improvements in porcelain inlays.

Dr. Wassall brought up a point with reference to a closed joint. I do not know whether he means that a joint which is cemented has no space or not, but it has always been my understanding that if two bodies coming in contact were not amalgamated, there was a space. This may explain how bacteria become enclosed in a space, held there, and excluded from oxygen, causing a breaking-down and undermining of gold fillings. I must say, however, I have never seen decay about a porcelain inlay that was at all well fitted. I thoroughly believe in porcelain inlays and they can be placed in every cavity in the mouth, although I do not believe in using them in all cavities, especially the occlusal surfaces of bicuspids. I think they are dangerous at the proximo-occlusal points. They will break away after the cement dissolves out, as Dr. Thompson has said. I have seen many such fillings well made in every other way. We do not like to see our failures coming to us. I put in gold inlays where an inlay is necessary, and I do not believe in porcelain.

Dr. E. M. S. Fernandez:

If I may be allowed to give my opinion of the papers that have been read this evening, I will say that I consider them very useful, and I wish particularly to commend the paper read by Dr. Wassall, for the reason that it is broad and comprehensive. He has not considered the actual manufacture of an inlay, but he has taken into consideration all inlay work at large. I agree with him in a great many of his views; at the same time, I am not ready to lay my gold filling instruments aside, for, as the old saying is, I have a warm place in my heart for a gold filling that is properly inserted, and I do not think we are prepared, as yet, to dispense with gold fillings. Nevertheless, I think the time has come when we must turn our attention to inlay work. We certainly can accomplish a great deal, both for our patients and for ourselves, by the manufacture of porcelain inlay work. If I understand it correctly a discussion on gold inlays is not in order to-night, as I believe the papers dealt exclusively with porcelain inlay work.

In the first place, why should we make a porcelain inlay instead of a gold filling? We should consider the nervous condition of our patient. A porcelain inlay may be of great benefit to the patient, and with a little care and regard for the patient's feelings and nervous condition, we can save a great deal of nervous strain to the patient. It will also, in a great many cases, save much strain to the tooth. It is no doubt a beautiful piece of work when completed, if it has been done in a mechanical way. In labial and buccal cavities I think we can make a very satisfactory piece of work, considering the poor material we have to fasten the inlay in place, namely, cement. The cements we have now are utterly unfit for this purpose. An ideal cement for the purpose should be of liquid form and transparent, which will enable us to put the inlay in its place, when made to fit properly, and then hardened by some chemical process as soon as we are ready for it.

I think the time has come when we ought to divide the subject into different sections. We must consider the preparation of cavities separately.

One gentleman said that a porcelain inlay should not be used in occlusal cavities because it was frail; that it would not stand the stress or force of mastication. I consider that a mistake. In the proper place, and the porcelain inlay made properly, and cemented in place properly, it cannot be weak, so far as the force of mastication is concerned. It will stand more pressure than a gold filling. If you make such an inlay properly, and cement it in the cavity properly, you will have a very solid piece of work. Porcelain will not expand and contract half as much as gold by the changes of heat.

The preparation of cavities would be altogether too extensive a subject to discuss at this time, but if permitted to do so, I will say a few words in regard to the preparation of some labial cavities.

First, I will consider the labial cavity on a central incisor, where there is plenty of body and the cavity is quite deep. Parallel walls should be avoided, and one should not go to the extreme and make very obtuse angle walls. (Here Dr. Fernandez illustrated how to prepare the cavity of this tooth by diagrammatic illustrations.) Unless we bring into good contact the labial margin of the inlay with the labial margin of the enamel, we will not have a satisfactory inlay, and by having the walls of the cavity slightly tapered, we will gain that adaptation by disintegrating the surface of the inlay beyond the margin. (Here Dr. Fernandez described a method of cementing such an inlay, using collodion as a cement.)

In regard to the matching of colors, my method is to match the dentine with the first or deep layer of porcelain, which is my foundation layer. The other layers I match in harmony with the enamel.

Another point which I have found very useful in the manufacture of porcelain inlays is to use quite a little coarse-grained powder. I find if I do not have a very even color throughout the inlay, which is accomplished by using a coarser material intermingled, giving a slight change here and there, any slight difference in color does not show as much as when the inlay is made of an even color throughout.

In forming a matrix, I save time by taking a slight impression with modeling compound or cement; I am not particular about making an accurate impression, but I take a piece of cement, mix it quite hard, press it into the cavity, well mixed with soapstone, and allow it to remain a few moments. Then I can conform the platinum over this impression of the cavity much easier than I can press it into the cavity, and in a few minutes I can finish it to the cavity itself in less time, taking it all in all.

Porcelain inlay work is certainly difficult, but we must remember that the beautiful is difficult.

DR. L. F. BRYANT:

In molars and bicuspids I have better results by taking impressions with cements. In my hands it is impossible to burnish platinum in a posterior cavity, especially in a compound cavity, because it is a difficult thing to get around the margins. If I have a good cement impression, I can work better than in the mouth.

On anterior teeth I find I obtain better results with Dr. Reeves' method of burnishing, because I can get the band in nicely, and burnish it down so that there is no spring.

In all cervical cavities I find it better to take impressions.

Dr. Reeves spoke of building up underlying colors, but I have found sometimes the whole of a tooth has a gray color, or it may be blue, and I have used a gray body, and yet the whole color seems wrong. I cannot get it straightened out, and I find I may just as well start over again.

Dr. Fernandez is rather hard on the cement people. I have had good success with cement, and, it seems to me, when the cement people work so hard to get something for us, they are to be commended for what they have given us rather than be criticised.

DR. G. W. HASKINS:

I want to say a word or two about cement. Unless we get cement that is translucent, but not necessarily transparent, we will not get light transmitted through the tooth. Porcelain is translucent, and it is our business to try translucent cement.

We cannot make an inlay look right until we get rid of the layer of opaque cement.

DR. A. E. MATTESON:

I was very much interested in the excellent papers that have been read this evening on porcelain inlays, also in the discussions. There are one or two points I would like to mention which I consider important.

With reference to making the platinum matrix I will say that my method is somewhat similar to the one spoken of by Dr. Thompson, with the exception that I use No. 40 or No. 60 tinfoil instead of ribbon or tape, and burnish that over the platinum. It holds the platinum in place; you can burnish the tin over it, and the method is similar to that which the brass spinners use. In the turning basin they begin in the center and spin outward. I have, besides hand burnishers, several fair-sized round burnishers which I use in my engine, lubricated with soap so as not to tear the tinfoil. The tinfoil should be kept well to the margins of the cavity. Understand, the platinum foil is underneath, and should be frequently burnished down, so that you are spinning out from the center of the cavity, and are changing the form but little at a time, then forcing that back again by burnishing over the cavity, and working it out until you come to the corners where you have your undercut, you might say your deepest corner or angle of the cavity. In some cavities, especially if the cavity is deep, this platinum foil will be torn at these angles. It may be torn in a number of places; maybe it hangs by a slight shred; but the tin foil will carry the platinum out with it.

I appreciate what Dr. Reeves has said about the underlying colors and the difficulty in bringing them out. This is largely a matter of personal equation.

Every inlay filling depends upon the cement for its usefulness. I will say that as a general thing the cements are all too coarse for this purpose. Before mixing it for an inlay, I put the powder in the mortar and grind it fine. I do not depend upon a metal or wooden spatula to grind them up. Cement fillings are the hardest proposition we have to contend with, and I do not think there is any man in the world who can make two cement fillings alike, making them a month or a year apart. I have put in two fillings with the same mix; one of them would last ten years, which is an exception, of course, while the other would not last more than ten months, and both fillings managed comparatively the same. How are we going to tell? We can do it outside of the mouth, but there is a difference in temperature, there is a difference in environment after it is in the mouth. It is a difficult problem for us to solve.

Dr. C. E. Bentley:

I want to say a word or two in regard to porcelain inlays along a different line than has been spoken of this evening.

There is a very interesting symposium in the *Dental Summary,* and it is one of the most interesting symposiums that have been held on this subject. The articles contained therein are contributed by men who have made their mark in porcelain inlay work. I was asked by the Editor to contribute to that symposium, and the subject of my discussion was "Conservatism in Porcelain Inlay Work." I am going to take that stand to-night. You may be surprised at my temerity in this splendid symposium of porcelain inlay experts, that I should take such a stand. But I think it is safe; it is needed at this time for some reasons which I will state, because of the general interest that is being manifested throughout the country on this subject, and I have ben in correspondence for the last six months with nearly every man who is going to give a clinic at the forthcoming meeting of the Odontographic Society, from Maine to California, or from Canada to the Gulf, and many of the clinicians have asked for an opportunity of making porcelain inlays. The country has gone wild, so to speak, on porcelain inlays.

Gentlemen, there is a porcelain tidal wave sweeping over the country to-day, and the wreckage that is to follow is going to be something for our consideration in later years. I claim that we have not yet had a long enough perspective on the subject of porcelain inlays to speak dogmatically. I owe all I know of porcelain inlay work, which extends over a period of four years, to Dr. Reeves. I came near being dogmatic about this work, for it is seductive, but with all due credit to Dr. Reeves for having taught me what I know about it, I must take exceptions to his radical position, and this is not the first time, for Dr. Reeves and I have crossed swords in private and in public in regard to this radical stand. I do not say this in an ungrateful way, but in a spirit of friendly criticism, which comes through the mutual intercourse of two souls for the benefit of the common weal.

Dr. Reeves has said that porcelain is a compatible substance. I have combated Dr. Reeves on the use of that term, because I cannot see how a dead and inert substance can be compatible with a living substance. Hence I take exception to the word compatible. Dr. Reeves has said it secures immunity. That statement can only be demonstrated by bacteriological experiments, and Dr. Miller has recently given to us one of the most valuable utterances on this subject of immunity that have come to the profession, and he has positively demonstrated by a series of experiments that no particular teeth, with the possible exception of the cusps, are free from caries and carious-producing germs. Hence I take exception to the claim that it secures immunity.

Dr. Reeves uses porcelain inlays in all parts of the mouth, and never employs anything else. I do not go that far. I believe in the more conservative statement of Dr. Thompson, and I have never yet, with very few exceptions, carried porcelain inlays beyond the ten anterior teeth. I can secure better results with common alloys, gold fillings, and gold inlays. It seems to me that is the conservative ground that we can well afford to take. The reason I plead for conservatism is because of the means of attachment to hold inlays in place. The behavior of cements in the mouths of different individuals and even in the same individual is different. Cement fillings may last in the mouth of one individual for six months, while in the mouth of another they may last six years. I, for one, have not thrown my plugger points away, and I do not intend to do so. It was my privilege, while on a visit in St. Paul, to look at the most beautiful operations I have ever witnessed, and I will challenge any man to put in a gold or porcelain inlay or to do more beautiful work than the class of operations I saw there. To ask that class of men, who have been saving the teeth of the people of that community for years by that method, to try this method is, in my opinion, radicalism, and it were better that we cling to the friends we have rather than to fly to others we know not of.

I wish to say to the younger men who are prone to take up new ideas to be careful, and considerate, and deliberate in taking up this work. It is the most beautiful work that dentists have been called upon to perform. In the hands of a bungler, it is a miserable failure; in the hands of an artist, it is a work of creation. It demands the most exacting character of work and skill, and unless you are masters, you had better not touch it. I plead for conservatism.

Dr. E. J. Perry:

I have but a word or two to say in connection with the excellent papers that have been presented this evening on porcelain inlays. Some time ago I had the pleasure of taking dinner with my friend, Dr. Bentley, and he stated to me that the pendulum in regard to porcelain inlays had swung back, and that he was less enthusiastic on the subject than he had been. He has sounded a note of conservatism to-night, and I think he has taken a sensible and logical position, and has adhered to it; at least, up to this time. The pendulum is a bad thing at that point or at this point (indicating both extremes). It is unsafe, save only at this point (the center), so the Doctor was twice wrong, and once right.

Porcelain inlays have one inherent weakness, and I do not believe that it can be entirely overcome, and that is the edge strength. In bicuspids and molars, where it is used upon the grinding surfaces, it has caused me a great deal of embarrassment; consequently I have adopted the use of the gold inlay. I call that difficulty with the porcelain inlay inherent, and it is not apparent to me how Dr. Reeves can overcome it. I like a radical man; I like an extreme man. He has a place. Radical or extreme men are leaders. But we must strike a happy medium between these men.

After listening to the papers, I derived more satisfaction from the paper read by Dr. Thompson as to what he said concerning inlays than from the others; but here is something Dr. Thompson did not tell you, and I want you to remember it. You will recall that he succeeded our dear friend, the late Dr. Swasey. No man ever picked up a gold plugger that could beat Swasey very much; but during the last ten or fifteen years of his professional life I am told that he inserted a great many gold inlays, and I have been informed that a considerable per cent. of Dr. Swasey's gold fillings have gone, almost every trace of them, but scarcely any of his gold inlays but what remain in a perfect condition.

Dr. Wassall called me down to his office to see a gold inlay which he had put in thirteen years before. That gold inlay comprised the grinding and proximal surface of a molar. I promise you, gentlemen, that it was in perfect condition; it could not have been in better condition if it had been inserted the day before.

There is something about this inlay business that we cannot afford to let go, and when Dr. Bentley got up and cautioned the younger men of the profession about using porcelain inlays, he may have frightened them. He has assured you that you are treading upon dangerous ground. Let me say to you, you are not. Don't be afraid to take hold of it. I figure it out this way: A man from Boston said in a meeting of the American Dental Association some years ago that he had never filled a tooth with amalgam. I do not recall his name, but that statement was made. It was a ridiculous statement. I presume he told the truth. He had not practiced dentistry in Chicago, or he would have found his equipment for saving teeth, if confined to gold fillings, very limited. We are to select the various filling materials suited to the individual cases for the purpose of saving teeth, and apply them according to their indications. That is all there is to it.

Dr. Edmund Noyes:

If I may be allowed a word or two, Mr. President, aside from the subject strictly under discussion, I will say that the theory of expansion and contraction of gold fillings in the mouth has been a good deal overworked here to-night. I said something about this matter to Dr. Black once, and asked him what there was in it. He said it was unquestionable that when the proper amount of force is used in condensing gold fillings, the very elastic dentine and enamel of teeth are compressed under the gold to a far greater extent than any amount of possible contraction of gold under any range of temperature that is possible in the mouth. The enamel and dentine will therefore follow any possible contraction of gold much as a steel spring will follow the withdrawal of anything that has crowded it.

Dr. D. M. Cattell:

I want to say a few words with reference to an idea that was brought out. Mention was made that gold could be further condensed in the mouth under chewing pressure, or that it could be moved by the force of occlusion or mastication. Unless it was a very poor filling, or one whose density gave it a low specific gravity, I do not think it could be moved, because with a specific gravity of fifteen or more it requires hundreds of pounds to further condense the mass of gold. There are a few fillings, I presume, that are placed in cavities which give a specific gravity less than fifteen.

In regard to inlays, I remember when I first came into the profession there was a great wave of pulp capping; later we had a wave of filling pulp canals with iodoform; then a few years ago we had a wave of cataphoric medication; and since then we have had a wave of this, that, and the other thing, and now we have, as was mentioned, a wave going over the profession of the country of porcelain inlays. While I am only known as a gold worker, and have done very little inlay work, yet I believe with all the flotsam and jetsam that is going along with this wave, that the porcelain inlay has come to stay. I think some are probably going a little too far with it, relegating their gold pluggers to the bottom drawer too soon. I am not ready to dispense with them. I bought seven gold pluggers the other day. But, after all, I think our inlay workers are educating us, and that, as a profession, we are being benefited.

Dr. C. N. Johnson:

This is a very fascinating subject, and I am not at all surprised that gentlemen who are familiar with the use of porcelain should become enthusiastic about it, and probably make statements which those who are conservative cannot agree with. The more we work with porcelain, the more delighted we become with it.

While I admire the excellent results that have been obtained in porcelain work by such men as Drs. Reeves, Thompson and Wassall, still there are some arguments that have been advanced to-night which, I believe, we cannot allow to pass without a word or two of thought upon them.

Dr. Reeves made use of the term compatibility, which was referred to also by Dr. Bentley in outlining what this word meant. As I understand it, the compatible material is one that will fit accurately the walls of the cavity and stay fitted. That is the kind of compatibility we want in a filling material. I do not believe there is any intrinsic virtue in porcelain itself, but I do think the principle of inlay work, whereby the cavity is sealed and all foreign material kept out, is what makes it successful.

In regard to the technique of fitting the matrix, instead of burnishing the matrix to the cavity in a tooth, or swaging the matrix to a model of the cavity, I swage the matrix to the cavity in the tooth; in other words, I use a system of swaging upon the tooth itself rather than the burnishing process. I do not believe we get the best results in bringing the metal burnisher in contact with the matrix, because by so doing we harden the matrix and cause it to have a tendency to warp. I use principally moist cotton as a means of swaging.

I agree in the main with the position taken by Dr. Thompson. He has given us a good conservative paper. He made an excellent point, that in the early stages of inlay work on the part of those who have been preparing cavities for ordinary fillings, they are largely handicapped by not recognizing an absolute difference in principle called for in the preparation of cavities for fillings and for inlays. The operator, when he attempts to prepare a cavity for an inlay, must have a different line of thought from what he has when preparing a cavity for a filling. Unless he does, he will encounter the difficulties mentioned by Dr. Thompson. That point should be kept clearly in the mind of everyone who does or expects to do inlay work.

With reference to the relegation of gold pluggers to the back drawer, that time has not come yet. Gold has done too much for humanity and too much for our profession to discard it by a mere snap of the fingers on the basis of a few years' experience with inlay work. That won't do. The fillings that have saved the teeth for the people of this country have been gold ones put in with pluggers.

The name of Dr. Swasey was brought up in connection with gold fillings, and the statement was made that most of those fillings that were inserted by Dr. Swasey are all gone. I want to bear testimony to the fact that they are not all gone, not by any means. Many of the gold fillings that were inserted by Dr. Swasey are standing perfectly to-day, and have stood for twenty and thirty years.

It will not do to quote him as a failure in putting in gold fillings, because he was not. There were very few, indeed, on a par with him as a gold operator.

Let me refer to another feature. Dr. Swasey was in advance of the times in regard to putting in gold inlays. He was an elegant operator, and was one of the first men to grasp the scientific principles of inlay work, and had he been living to-day he would be one of the foremost men in inlay work. In the latter years of his life it is possible he was not so skillful in his manipulations, and it is not expected that he would be. His best work was done twenty years ago, but the relative merits of inlays and gold fillings cannot be estimated in that way.

There are certain cavities in teeth in which, with our present knowledge and our present improved technique, it would not be good judgment to use porcelain inlays; for instance, in small occlusal cavities in molars and bicuspids. I do not believe it is economy in time or more efficient in service. I do not want anything better than gold in that class of cavities.

As to an open joint between a gold filling and the cavity wall, Dr. Wassall made the statement that with every gold filling there was an unavoidable space between the gold and cavity wall. I regret to have such statements made in this society. If there is any possibility in the manipulation of gold, whether non-cohesive or cohesive, it is the possibility of absolutely hermetically sealing the cavity with gold foil. This is not theory; it has been demonstrated time and again in the mouth and out of it. It is a simple matter to condense gold properly, and gold will stay where it is put.

Before sitting down, I desire to say a word or two to the young men of the profession.

I believe every dentist should make himself familiar with inlay work and with the methods that are open to him. If he does not, he is not discharging a duty which he owes to his patients and the profession. Inlay work has come to stay. There are places where it is definitely indicated, and where to do anything else than inlay work is a mistake. However, I do not believe it is applicable to all cases. I believe the best advice to the young man is this: To make himself familiar with every feature of inlay work; to have in mind all the time the intrinsic and fundamental limitations that are connected with it, and taking a broad and comprehensive view of this as of every other subject in the profession. The great difficulty with many men is that they can see only a small bit of a thing at one time. Study inlay work so as to be able to see where it is indicated, and learn not to use it where it is contraindicated.

DR. L. H. ARNOLD:

With reference to what has been said as to a desirable cement, there are some important points connected with it, one of which has not been referred to. How can we expect uniformity in results when we do not have uniformity in methods? I do not believe there is a member of this Society who knows what proportion of acid he uses to a given amount of powder. How can we make a chemical compound of definite, desirable composition when finished, without knowing the proportions of ingredients we use? It is also the same with amalgams. We need a scale that will proportion for us the ingredients in such amounts that the resultant compound will contain definite percentages of those ingredients. I mean by that, we should be able to sprinkle as much powder in one side as we need, and in the other side get the exact quantity of acid to make the proper compound when finished. For this purpose, there is no scale on the market with which I am familiar.

As to what Dr. Johnson has said, with regard to there being no space between the gold filling and cavity wall, theoretically no two bodies are absolutely in contact except they adhere. Theoretically, therefore, they are not in contact.

DR. W. V. B. AMES:

It has been a long time since I began to pin a good deal of faith to inlays. Dr. Swasey probably antedated me in constructing and putting in something like gold inlays. But I want to say something about the cement question, and will refer particularly to what Dr. Arnold has said of this matter of having scales for the purpose of making definite mixtures. I predict that the farther he gets into that project the more he will feel like charging it up to misdirected energy, because he cannot get cement exactly twice alike from any manufacturer. The working of cement depends largely upon the quality of the liquid and the pigmenting and grinding of the powder. The quality of the liquid I shall say little about, except that the liquids, of course, differ because the phosphoric acid is modified by different metallic phosphates, and the working qualities will depend upon those metallic phosphates and the amount of water contained in the liquid. The liquid will possibly vary in specific gravity as you get it from time to time. Some dentists have adopted the method of quickening the setting of slow setting liquid by adding water, so you see there are conditions of liquid which you can control, and other conditions which you cannot.

The influence of differences in the powder comes chiefly from the fineness of division, pigmenting exerting a slight effect to cause different colors to vary slightly in their behavior. The pigmenting may be uniform in one package after another, but I doubt if any cement manufacturer is able to produce lot after lot, with powder of sufficiently uniform fineness that any measuring or weighing process will be worth adopting. With a given liquid the finer the powder the quicker will be the setting, so with the difference of fineness of powder, difference of pigmenting and differences from atmospheric conditions, the dentist or assistant had better become familiar with the proper sensation of cement under spatula than to expect to be helped out by any getting of definite proportions of powder and liquid. I will stake my reputation on that.

With reference to inlays, if you can properly adapt an inlay to a cavity and have it sufficiently strong to set it with the cement mixed to the proper consistency, you will have a good operation. If you make an inlay with thin extensions or sharp angles, when you come to set it, if you are afraid to mix the cement to a decent consistency, you had better not set it. If you have not sufficient strength in the inlay itself to enable you to give good vigorous pressure, to squeeze out cement of a decent consistency, you are going to have failure, I do not care what cement you use. There are possibly cements especially adapted for this purpose. But remember this, you dare not reduce that powder to a fineness beyond the point which will enable you to make a nice plastic mix, as the extreme fineness of powder would give you a clotted, gummy mix, which will not work nicely, and you will not get your inlay as nicely to place, and you will not have the strength of cement that you will if you use a powder which is less fine. I do not believe that the average inlay is so closely fitted that an impalpable cement powder is needed.

If I were going to make porcelain inlays in teeth that were to be subjected to occlusal force, I believe I would make accurate models of the occluding jaws and set them up in an anatomical articulator to study the occlusion of the teeth in all their movements, and outline all cavities by studying the occlusion. Are we justified in so cutting cavities in many cases as to bring the margins beyond the stress of occlusion? That is something we have to settle by much study.

Dr. Reeves (closing the discussion on his part):

A great deal has been said this evening with reference to cements, and that has been a weak point in regard to inlay work. We grant nothing is stronger than its weakest point. But we know that inlays have stood and are standing a great deal better than the same number of gold fillings have stood in any of the mouths under all conditions, and clinical experience demonstrates that the inlay is better than a gold filling. We can count on our two hands all the gold operators in this country that are looked up to as being expert gold operators, and we will include them in comparing the durability of inlays with gold fillings.

So far as the tidal wave of porcelain inlays is concerned, I took hold of the pendulum at that end of the swing (indicating); I have gotten at the center of the swing, with a good firm hold, and I do not expect to let go, and when it goes on up the other way, I expect to obtain still further success in porcelain inlay work. I think that any dentist, no matter what his ability is, if he will give one-tenth of the time toward mastering the technique of putting in porcelain inlays or restorations, he will do twenty-five per cent. better service for his patients than he will accomplish with any other material he has to use. If we could raise the percentage of success in the whole country to twenty-five per cent it would be a great increase, and I think it would equal that, because I believe the gold fillings of the average operator would be worse than his inlays, after having devoted some time to the preparations for and insertion of the latter. The average operator would go on to an increase of service to his patients to, at least, fifty per cent. in tooth-saving conditions. It is foolish for the average operator to undertake the more difficult inlay work. He should begin with cavities he can manage, and gradually advance to those that are more difficult. As he gains experience, he will have an increasing range of cavities that he can handle. If a student were to try to put in gold fillings along with a man who has been practicing dentistry for fifteen years or more, he would make a dismal failure—a more dismal failure than he ever would in starting out with inlays, although he would meet with some failures in doing this work.

Dr. Johnson spoke of compatibility and two or three others referred to it.

I do not think this word should be brought up in the discussion. I think I quoted or mentioned it in a paper read at the Colorado State meeting. Porcelain is a material that fits perfectly the definition that is given of compatibility. We have in porcelain a material that comes so near restoring a tooth to its normal condition, that practically we can say it is restored to such a condition. I could cite a number of instances in which there have been fresh exposures of pulps in the mouths of young individuals, the pulps being healthy, where porcelain inlays have been made, burnished down to fit the cavities, with a minimum of cement between the inlays and cavities, and their teeth have been perfectly normal thereafter and have never given them any trouble. That is, I think, sufficient argument as to the compatibility of porcelain to save tooth structure.

There is one thing I did not mention in my paper, but I want to give it to you. I have not had it under observation long enough to say anything definite about it. It is this: I believe we are going to get good results in cases of erosion. I have not seen any extension of the erosion after the cavities have been filled with porcelain inlays.

Dr. Thompson (closing the discussion on his part):

As far as I am concerned, the pendulum has not reached the other end yet. I am putting in more porcelain inlays to-day than ever, and I expect to increase in the number that I insert.

Dr. Johnson spoke of moist cotton as a means of pressing the matrix to the cavity. I find that moist bibulous paper answers better, using small ropes, and packing it in, and it will stay better, it will pack closer and be harder, and the matrix can be filled up the same as the filling is going to be finally, and the paper can be removed if the interproximal space will allow.

Dr. Johnson also spoke of not using a metal burnisher. There is a feature of that that has not been spoken of, and it is this: The more the margin is burnished, the more it is thinned, and after the matrix is removed, the filling is thicker at that point, consequently it would have a little protrusion which would lie up against the margin and draw nearer to it than the rest of the filling, and there would be room below where this would touch. Dr. Fernandez spoke of allowing the filling to drop into the cavity, thereby closing the space caused by the removal of the matrix. To do that, it would be necessary that the angle should be forty-five degrees to allow the removal of the matrix at the bottom to close the space on top.

A word or two as to what was said with reference to the late Dr. Swasey. I do not believe there ever was a man who put in gold fillings to stay better than he did. I see fillings continually that were put in by him that have lasted almost as long as I am old, and they are perfect. I see some of his fillings continually that have been in the mouth for ten, twenty, and thirty years, even some before the Chicago fire. What I would say is this: In mouths where gold inlays and gold fillings were inserted at the same time, even though they were inserted by one of the best gold operators, the gold inlays are the better. I have found them in mouths where they were the only fillings that were good.

Dr. Wassall (closing the discussion):

I feel that I ought to say a few words with regard to cement. So many dentists seem to be under the impression that if it were not for the poorness of the cement we use, the inlay would be all right. That is one of the unfair criticisms against this work. The cements have done a wonderful service; to prove it, are there not a lot of inlays that have lasted ten and fifteen years? We also are apt to lose sight of the fact that crowns and bridges are fastened with cement and have stood for many, many years.

With regard to the heresy I am said to have preached, I am surprised that Dr. Johnson so far forgot his scientific teaching as to say that there is no space between a gold filling and the cavity wall. He may say there is none, but it does not alter the facts. We can get a certain amount of apposition between gold and the cavity wall of a tooth; we may even seal it hermetically with gold in selected cases. But that joint will not necessarily remain hermetically sealed. Let us take an occluso-proximal surface in a bicuspid or a proximal cavity in one of the front teeth, for instance; we may in many cases be able to make a tight filling, but the walls of such cases will not stand the amount of force usually necessary to make a permanently tight joint. This space may be microscopical, but it is always measurable, and that is the point I made in my paper.

ST. LOUIS SOCIETY OF DENTAL SCIENCE.

DISCUSSION OF DR. HARLAN'S PAPER.

Dr. Lischer:

Only a few weeks ago we had the pleasure of reading a very able paper by Dr. Harlan on "The Basis of Dental Medicine," and were then very much impressed with the fact that the present status of our knowledge is such that possibly in the very near future this much neglected subject will come to the front upon true scientific merits. I am glad Dr. Harlan responded to our committee's call with a paper that promises so much along a new line. I cannot add anything to it, but merely assure the essayist that we are ever willing to accept something good and new.

Any one who has ever dissected a sufficient number of teeth must certainly come to the conclusion that the perfect filling of all canals is one of the impossibilities, even though they can be entered with a broach of the smallest size. The thorough cleansing of the fine and tortuous canals of molars is equally hard, and while devitalization of their contents is by far easier, still of what avail if they cannot then be cleansed?

I believe that a good deal of the soreness met with in treating teeth that come to us free from any pericemental disturbance is due either to a faulty diagnosis or a slovenly technique. Again, I feel almost certain that the soreness following the application of arsenic to freshly exposed pulps (even in adult patients where the apical foramina are certainly small) is nearly always due to an overdose of the drug.

The painless removal can be very often accomplished by allowing a sufficient period of time to elapse between the removal of the arsenical dressing and the final removal of the pulp—during which time I usually apply a tanning or mummifying agent, according to the formula suggested by our friend, Dr. H. Prinz.

This so called "mummifying paste," when made according to Dr. Prinz's formula, I also very much prefer to chloro-percha as an adjunct in root-canal filling with gutta-percha cones. We all know that chloro-percha shrinks upon drying, and so the practice of filling these fine and tortuous canals with Gram's copper points dipped in chloro-percha, as has often been advised, is certainly not the best filling. If a Gram point can be introduced in a canal then a fine broach (preferably one made from gold-platinum claspwire for the purpose) can also be introduced to pack that canal with mummifying paste.

But under no consideration would I advise the mummification of a pulp in its entirety; only using this remedy as an adjunct after the most thorough cleansing. I believe also that most operators who have experienced a great deal of trouble after treating and filling root canals, must candidly admit that their technique was slipshod; that they were too tired; or perhaps the fee was not in sight.

However, if pulp digestion will render canal cleansing easier, then I for one shall gladly welcome it, but I still insist on a thorough technique in this as in all other operations. Again, I firmly believe that time spent in enlarging canals is time well spent; that in the majority of cases of pulp devitalization, removal and consequent filling of the canals in the ten anterior teeth, we need no other remedies besides the devitalizing agent, and after removal the thorough drying with absolute alcohol, and as an adjunct to the gutta-percha cone I prefer the best eucalyptol.

Dr. Bowman:

About thirty-five years ago I conducted some experiments in root filling, to determine, for myself, the best material with which to fill them. In the course of the experiments I filled a molar with two roots, one of which I filled with gold. The other root had apparently two canals, but one I was unable to penetrate very far. I introduced gutta-percha in chloroform into this root, and when it was opened, lo and behold, I found what I deemed the *ne plus ultra* of materials. The filling had extended to the foramen, had crossed the border into the other canal, extended both forward and rearward, and into the intermediate territory, and the opening was perfectly filled. I said any material that could go forward and backward and sideways is the material I am after. I have used gutta-percha-chloroform, gutta percha mainly, ever since that time for filling roots of teeth. I had previous to the papain theory as illustrated and given to us by Dr. Harlan—I had tried to mummify such portions of pulp as I thought I might possibly have left in the root. I practice that to-day on all roots that I fill. Having effected the removal of the pulp as far as possible, and aiming to do it perfectly, I precede the gutta percha with a mummifying paste and since the papain theory has been promulgated, I have used that. It is very fresh in my memory for I have removed four pulps thus treated to-day, and, I think, two dozen within two weeks, and I am very happy to say that I appreciate this method. I believe it will revolutionize the treatment of roots. Certainly my patients are very grateful to me when I tell them this pulp is to be removed painlessly—merely washed away instead of pulled away, as we formerly did it; and I, for one, am very happy to have been present here to hear this paper. I hope we shall see it in print, where we can refer to it and make it our own. The practice of making this paste fresh each time is a very good idea. I am satisfied the results will be better than when a paste long prepared is applied.

Dr. Fuller:

I have never used papain to any extent, but I certainly shall, as I think all of us can see the benefit to be derived from its use. I would like to ask if this preparation deteriorates?

Dr. Harlan:

The quality is fixed and the preparation is always kept in dark bottles and no deterioration takes place. The best preparations are made by Merck, Lehn and Fink, and Johnson and Johnson.

Dr. Fuller:

Is the acid kept on hand?

Dr. Harlan:

The solution is kept on hand and used as needed, that, of course, not deteriorating.

Dr. Prinz:

Ever since the publication of Dr. Harlan's paper on pulp-digestion I have closely followed all further reports on this interesting question of treatment of the dental pulp. These, together with my own experiments, have given me quite a little experience on this particular subject. The first attempt to use a ferment for the destruction of the dental pulp was probably made by Oakley Coles, of London, in 1872 to '73. The reports of Keyes, Linn and others followed, but it was left to Arkoevy, who in 1881 called the attention of the dental section of the Internation-Medical Congress, convening at London, to the use of pepsin in this connection. Arkoevy, however, applied the pepsin upon the living pulp and found that it had to be used in large quantities and for a long time, and still its effect was very uncertain. Most likely, on account of what we may call vital resistancy, the ferments do not act readily upon living tissue; although it has been shown that the leg of a living frog introduced into the stomach of a dog through an artificial gastric fistula may be digested. Now, the question may be asked: What is a ferment? This we are unable to answer with satisfaction. Probably no one has ever seen a ferment. A ferment represents a distinct, independent phenomenon of life itself. And what is life? DuBois-Reymond has termed it one of the riddles of the universe. According to Bunge, life is activity—the change of latent energy to kinetic force. But to return to the ferments. The active ferment pepsin which carries on digestion in the stomach will, if prepared according to the pharmacopeia, digest from 3,000 to 15,000 times its own weight of albumen. Its concentration is practically unlimited. If we take a freshly removed pancreas, the organ which furnishes the digestive ferments to the intestines, pound it up in a mortar with broken glass or sand, and subject the whole to a powerful pressure, we obtain a limpid liquid which will carry on digestion perfectly. If we subject this same liquid to severe cold, its action is greatly inhibited; if we subject it to a certain degree of heat, its action is entirely destroyed. Where lies the activity hidden? Unknown. However, let us return to the point in view—pulp digestion. It seems to me that in using papain we have to deal with an uncertain compound and this fact may partly be responsible for the varying results obtained. An acid mixture of a high concentrated pepsin, say 1.15000, will give more definite results. The process of digestion means a physical change of solid or semi-solid albumens and proteids into liquid peptones. If we should be able to digest the contents of those very fine, hair-like canals which are inacessible to a broach, are we always able to remove the digested products? I, personally, cannot answer this question satisfactorily. I still believe that in such cases, where it is a physical impossibility to remove the pulp remnants entirely, the mummifying principle, if correctly applied, is justifiable. The last five years have demonstrated to me that the application of this principle has given satisfactory results and the hundreds of cases which during this time have come under my observation verify the fact.

Dr. Windhorst:

A little vial of caroid was left at my office about five or six weeks ago with the statement that Dr. Harlan introduced it, so I availed myself of the opportunity to try this in the case of one of my own little boys. I had destroyed the pulp with arsenious acid, but when I picked up those "needles" the whole deal was off. I tried the caroid; changed it every four days and in about sixteen days I washed the contents out of that tooth without the slightest pain and I think I filled the roots perfectly, and it was a great pleasure to me to work for this little fellow after he found out that I would not use those "needles" any more. I have used it in several cases for adults, with equally good results—one especially where the pulp was almost entirely putrescent, but on going into it with the broach there was a good deal of pain; and to my surprise after leaving this caroid in the tooth for five or six days, I think it was, the contents were practically all gone—nothing left. So I shall try some of the papoids and papain and mix the preparation myself. I wish to thank Dr. Harlan for his kindness in coming down here and entertaining the Society with his valuable paper, and I thank him in the name of the Society.

Dr. Harlan (Closing the discussion):

In answer to the question of Dr. Angle I would say that I have used papoid and papain and caroid—all of which are due to the vegetable ferment isolated from the paw-paw, on putrescent pulps, and I said in my paper that in a few hours it would promptly convert them into a fluid or semi fluid state so that it was easy to get rid of them and wash them out. Of course the only idea that I have had with reference to the removal of pulps from teeth was to get all of the animal matter out of the roots, and in answer to the question of Dr. Prinz: Why not use the alkalies? I would say that there is no objection to using the alkaline solution on the pulp, because the preparation will act perhaps equally as well; I only say equally well for the reason that I have not used the alkalies a sufficient number of times, and I know if I take a glass slab and mix all three pastes, all on the same slab, and take three freshly extracted pulps and treat those pulps with dilute hydrochloric acid 1 to 300, or a dilute solution of soda, that they will all be digested equally well if you keep them all at an equal temperature—100 or 98 degrees. We usually fix the temperature at 100 because this is a little above the animal heat. All of the experimentors who have tried the removal of the diphtheretic membrane have said that if they sprayed with an alkaline solution it did not seem to affect the active principle of the papain. Dr. Wm. Murrell said that from 6 to 8 preparations that he had been able to obtain in London he found that an equal quantity of papain did not digest meat, beefsteak, as well as animal pepsin, but he may have been unfortunate in getting his preparation. Any of you who will send to Johnson & Johnson will get a very instructive paper that will tell a great deal about the paw-paw; it will be of value. This is no secret preparation or patent. This is simply an effort on my part to see if I could present something that would digest the pulp and liquefy it so that it could be got out of the tooth. Dr. Prinz did not quite understand me in my paper; I said: Was it certain that any of the mummification processes would be permanent at the end of 20 years? I did not say that a tooth would be perfect at the end of 20 years if the pulp had been digested by the use of papain. In reading the history of mummification of the human body, we find that the body was always swathed in clothes or bandages and kept dry and put away somewhere on a shelf; and in the mummification of the pulp the moist juices still surround the root, and we do not know yet that at the end of 20 years the mummified portion will stay. I am simply presenting a method of digesting a pulp, and whether it is the vital principle that causes the fermentation or whether it is a microörganism with the amount of heat that is required to isolate the papain from the paw-paw I cannot say. The question is a vital one for dentists. There are 32 teeth in the human jaw and the pulp of any one of them is likely to be destroyed by accident or by design or by disease, and if you can use something that will absolutely and positively disintegrate it so that it can be removed, I think you have a pretty good thing, and it simply requires fidelity and attention to details; and, as Dr. Lischer said, it is the technique that is needed. Without technique you cannot make beautiful gold plates, or porcelain inlays, or anything else. With reference to the different preparations: Somebody has said that imitation was the sincerest form of flattery. The first people to get out anything in the papain line in the United States were Wm. S. Merrill Co., of Cincinnati, and as soon as Merck succeeded in getting a papain that was marketable I think everybody else wanted to get something which had the active principle. Caroid is simply the proprietary name; papain is the active principle that is in it that does the work. They use it for all forms of dyspepsia. Papoid is simply a trade name; it is papain which is used. From experiments that have been made on pulps of teeth out of the mouth and in the mouth, we find that there is practically very little difference in the action of papoid, papain and caroid. Last Wednesday morning I introduced some papain paste into a second molar tooth for a lady. She had the pulp destroyed in that tooth on Friday of the week before, so that was five days she had the arsenical application in the tooth. Arsenic does not seem to be any bar to the digestion of the pulp. On Monday morning of this week I removed that pulp and filled the root—from Wednesday until Monday. I expect this was an exceptional case because the pulp was dead when I made the application, but it completely digested it so I could wash it out entirely after that time, and I filled the root. There is nothing in papain or in glycerin that will stain a tooth, so you need not be afraid of that. There is nothing in hydrochloric acid that will stain a tooth, unless you use Missouri River water! and that will stain even a tooth. I am very glad to come to St. Louis. The first meeting I attended in St. Louis was in 1873, and I have pleasant recollections of St. Louis from that day to the present time, and I hope that from time to time, as long as I live, I shall be coming to St. Louis; and if this paper will be of any service to you and will be of any value to humanity, I am very glad to have been able to present it.

MINNESOTA STATE DENTAL ASSOCIATION.

Discussion of a Paper by Dr. G. W. Cook, Chicago, on Some Predisposing Factors of Local Infection.

Dr. T. B. Hartzell:

On the first part of the paper I have no conclusions to offer. It deals with the regeneration of the body, and the paper as presented by Dr. Cook is essentially correct in all its particulars in regard to that part of the subject. With some of the deductions that he makes I must differ. One may easily see by listening to this paper that Dr. Cook believes that most of the ills that flesh is heir to are due to the presence in the alimentary tract of bacteria. I would hesitate to state the case in that way. The thorough cleaning out of the alimentary tract places the individual in the best possible condition to repair any damages that have been wrought in the system. He assumes and states that the alimentary tract in the body is normally free from bacteria. I beg leave to differ. At birth or prior to birth the body is invaded by bacteria, and never from that time on is it free. I believe it would be possible to find cultures of the different cocci in the bodies of the most careful individuals we might select, and that we would find the bodies of those individuals in a perfectly normal condition. We might also say that bacteria are largely responsible for many of the ills that flesh is heir to, and infer from that that they are detrimental to all sorts of life, but the fact is that bacteria in many cases are exceedingly beneficial. They perform, perhaps, the most important functions that we know of, and I do not believe that the bacteria found in the alimentary tract are detrimental, at least it has not been proved. There was another point that I want to take up, and that is in regard to the elimination of the substances we find in the alimentary tract that are produced by bacteria, and that the elimination of excrementitious matter is performed in that way. We eliminate many other things through the lungs, quite a number of things, and what dentist has not noticed the odor of onions from a patient over whom he has worked? Odors do not come up though the esophagus; they are really due to elimination from the lungs. They do not eliminate in the sense the kidneys do. As I was coming up in the car I caught the odor of alcohol; that was an elimination from the stomach. So I could not agree with the argument in regard to bacteria. I believe that most of the ills that flesh is heir to have their inception in ptomaines, that the elimination is due rather to the retention of the ashes of living. Daily we take in a large bulk of food, most of us more than we need; we take in more than is necessary to form the tissues in our bodies, and with every act of our lives degeneration of these tissues takes place, and if we are not careful to get rid of those ashes we will retain all the body waste. He said auto-intoxication is the result of decomposition of matter in the alimentary tract and produced there. Then he goes on to prove that that is not the case. I never have believed that auto-intoxication is due to such a cause, but I do believe that auto-intoxication is rather the result of the retention of urea in our eliminative organs which they fail to rid us of. Perhaps I am wrong, but I am offering you my opinion just as it comes to me at the moment of the consideration of this subject. I believe if we have wastes in the body due to injurious living that we fail to eliminate we will have bacteria and other injurious things residing in the alimentary tract and in other parts of the body, but that is only a coincidence. Then he says that we have a balance between the waste and repair, which he calls the inherent forces which protect the body, and by means of which the normal individual obtains the equilibrium. The inherent force which insures immunity we understand to be residing in the blood, and we know enough about the blood to know that it contains two classes of leucocytes that contribute to this immunity. We have learned this by an artificial process. There are two classes of leucocytes, and this inherent force is nothing but a well supplied circulatory system controlled by two classes of leucocytes. I will say further that one class of leucocytes furnishes the element that destroys bacteria when they come in contact with it. We have another leucocyte that increases the circulatory system and takes away the waste. As far as the balance of the topic is concerned in its bearing upon immunity and cases cited, I will only touch upon one or two, as my friend Col. Van

Duzee is to follow in this discussion. We have boils, which are really a class of pus-bearing bacteria underneath the skin. They are deep abscesses and they are dependent upon infection. They are due to the development of bacteria, and these are propagated with such rapidity that only a few hours after they have been placed in a tissue solution you will find dead leucocytes and a general breaking down of the tissue. Are these boils due to the fact that we have bacteria in the rectum or in the stomach or in the mouth, or are they due to the fact that we have diabetes? Are they due to either of these two causes. I say no. They are not directly due to either of these causes, but when we have bacteria in the alimentary tract we have superimposed upon the diabetes a secretion of the kidneys which should pass out as urea or uric acid, but the organ fails to perform its office, and there are thus retained in our bodies those wastes, and the circulatory system is incapable of coping with the local infection and those leucocytes do not approach the seat of that infection. It is hardly fair to charge the alimentary tract with all that. We could cite several other examples right along the same line which would convey the same idea, so I believe that the growth and development of these bacteria is not the thing that we must guard against, but I think rather we should take a broader view of these local conditions. Pyorrhea alveolaris has pretty well proved to be due to the retention of waste material, and through the terminal vessels it reaches the bone and penetrates through the peridental membrane and butts up against the cementum surface of the tooth. They are the terminal vessels. In the corners of a room dust accumulates, and if there are any waste places in the body an accumulation forms in the terminal vessels. They are admirably situated to receive those wastes. Pyorrhea is not due to the alimentary tract, but it is due to the retention of those wastes, and that is the place where we see the ravages of an inflammation first with all the interstitial gingivitis, as Dr. Talbot calls it, because these vessels pass through the bone and irritations follow, and when deleterious material is added to aggravate the inflammatory process by reacting against the tissue it still further adds to the flame.

Do not depend too much upon the alimentary tract, because you cannot but recognize that it is the normal habitat for bacteria, but look to see that the body thoroughly excretes its waste.

Dr. C. A. Van Duzee:

Dr. Hartzell has gone into the discussion of this paper very carefully. I am sorry I did not have the privilege of making a more careful study of the paper, but in reading it over this thought occurred to me, that Dr. Cook was to be congratulated upon reducing into a very small compass a vast amount of very good knowledge for dentists, and if we might have a series of such papers as this compiled in the form of a book, those of us especially who are too busy to make a special study of this particular field might be enabled to grasp in a very general way these things which are of inestimable value in every day practice.

Dr. Hartzell confined his remarks to the scientific aspect of the case, and I am going to try to go the other way and talk from a practical, everyday standpoint, which is the standpoint most of us are obliged to take in discussing and thinking of these things.

There is no question but what Dr. Cook and Dr. Hartzell are both correct in those things that we have apparently differed upon. My personal experience has been that when good medical men, scientific men, are discussing a subject they both think the same thing, they both mean the same thing, and they both arrive eventually at the same point, but their arguments are colored or worded a little differently, they approach the subject from different standpoints and through different channels, but their opinions ultimately coincide. The greatest bugbear in dentistry to-day, I think, is the treatment of so-called pyorrhea alveolaris. I think it is the thing that tries us the most of all, and there is no question in my mind but that the opinions expressed in this paper represent very clearly those things that we must digest in order to successfully combat this disease. The normal body, while it may not be absolutely sterile, is thoroughly capable of taking care of itself, and when we see such things as interstitial gingivitis, boils, etc., in all such cases we can reasonably suppose the body is in such a condition that it cannot protect itself from the causes which are ever present and which produce those diseases. I think as dentists we should study and scientifically apply these things which tend to lead our patients into a correct way of living. While it might not be true that the alimentary canal is responsible for all these things, it is true that the alimentary canal in a large majority of people is overloaded. It is an excretory organ, and if it is incapable of taking care of the waste, or performing its office, it is simply a factor which lends itself to this general condition where the body refuses to eliminate those things which are detrimental to it. In my early practice the treatment of pyorrhea was something that I undertook in a great many cases with more or less success, until the time came when I began to realize these very things that have been spoked of, and then I began to insist upon my patients' breaking away from their old way of living and using a little common sense. I think Dr. Johnson, of Chicago, makes the remark that if a man would treat his body with the same consideration with which he treats his cow and his horse he would not have any trouble. The average man does not do that, nor the average woman either. I think we should lead them to realize the sense of that fact, if they wish to be free from disease, if they wish to be cured from disease they should at least give as much care to their own bodies as they do to their horses.,

Now the question of immunity from decay is agitating professional men throughout the world to-day, and I think it depends largely upon the things that are treated upon in this paper. We cannot hope to have immunity from decay under conditions that are favorable to the retention in the body of those waste materials. If we are going to bring our pupils into that condition where they may expect immunity from decay we will have to teach them how to live to acquire that condition. I think the world is ripe to-day for the teaching of this particular thing. In order to be successful practitioners of dentistry we must go into this subject deeply and must become familiar with those things which shall enable us to lead our patients out of this diseased condition.

I was somewhat amused in listening to Dr. Hartzell's discussion when he spoke of the retention of the ashes of living in the system. I do not think there is very much difference between the ashes in the system and the ashes in the alimentary canal. I do not think, however, he is so very far away from Dr. Cook on that matter.

DR. C. E. BENTLEY (Chicago):

I am very much in accord with the utterances of the gentleman last on the floor, the necessity of going deeply into matters of this kind in order that we may get the maximum of good out of our profession. I am a little amused and amazed at the experience of Dr. Hartzell in speaking of the treatment of interstitial gingivitis. I am very glad Dr. Talbot is an intimate friend of mine, and I am very glad he has conducted his propaganda up here, but down our way we do not give interstitial gingivitis the same respect that Dr. Hartzell intimated it received here. He makes the positive statement that it is the lodgment of deleterious and effete matter at the end of the arteries, where there is no way for it to get out, that produces what is called degenerative inflammation. That is the most positive statement concerning the histology of pyorrhea alveolaris I have ever heard, and I hope the doctor will be able to prove what he says, and if he is we are in a very good way of getting at the causes of this bugbear that is so dreaded in our profession.

I want to speak commendatory of Dr. Cook's work because I am acquainted with what he has done. He is one of the few men in the dental profession who are giving most of their time for the benefit of the profession. If he will only close his ears a moment I would tell you that he is one of the most unselfish men and one of the most indefatigable workers in the city of Chicago. Not long ago when I thought I was very tired working over patients George came "clumping" into the office and tumbled into a chair. I said, "What is the matter?" "Well," he said, 'I have been out ever since eight o'clock this morning." I said, "Where have you been?" He said, 'I have been down to the stock yards, and I have examined sixty heads of sheep this morning, and I have made some cultures and hope to find out something about the histology of pyorrhea alveolaris." The thought occurred to me that here I was in my office making as much money as possible, while George Cook was down at the stock yards examining dead sheep that I and the rest of the profession might be benefited, and you have been reaping the reward of some of that very work, and I say for one I honor Dr. Cook for what he has done and is doing for the profession. (Applause.)

Dr. G. W. Cook (Closing):

I feel I have taken a great deal of the time of the society in listening to this paper, but the subject has been chewed on at different times in a fragmentary way, so I felt if I gave a paper at all I must go into the fundamentals if possible, and it took a great deal of oil and a little gray matter to get it out.

The first proposition of Dr. Hartzell's regarding the germ-free condition of the body. Of course we do not recognize after birth that any individual is at any time free from germs, and that is the reason I took up the subject in a broader sense. We are constantly in contact with bacteria that are eliminated through the activities of the intestinal tract, which is a fact of a great deal more importance than was supposed before investigation. Bacteria are active principles in carrying on certain physiological functions necessary to life in the destruction of organic substances; that is, of course, a demonstrated fact, and the probabilities are that we could not live were it not for bacteria. I doubt whether we could grow a blade of corn or grass without bacteria. Almost with every inhalation we take micro-organisms into our mouths, but unless we are not prepared to carry on this fundamental activity of the body we have little reason to fear injury from these micro-organisms.

Then we heard something about the leucocytes—the leucocytes that penetrate the epithelial tissue. Those leucocytes have nothing to do with the eliminative process that takes place in the intestinal canal, and it has been thoroughly demonstrated that if we take the intestinal true colon bacillus in cattle it immediately penetrates the wall of the intestinal tract, with the exception that in some cases a degenerative condition takes place, while in dogs and other animals the reverse occurs. The bacillus instead of producing a degenerative condition in the tissue remains in the tissue and remains a bacillus.

Next, there is a retention of urea. Why do we have to use it? The doctor says it is necessary in the retention of the excretions. What is the cause of it? That is the point I made in my paper. We can state here in regard to the pathology of disease that there is no such thing as disease arising within the body; not in vegetable or animal life, so far as we know. There are a great many things we do not know anything about, but those we know we can demonstrate absolutely. We know they come from external causes, and frequently at the time of investigation we are pretty nearly ready to say that we can trace the diseased condition to an external cause and not to an internal one. Therefore, if there is any retention of excretion in the body it is due to the very cause I have told you about; it is due to the eliminative process in the intestinal tract. These are simple facts. Dr. Hartzell says immunity is due to certain leucocytes. There is a false immunity that exists when there is some outrage upon the body. When we make an incision in the skin, wherever it may be, immediately leucocytes come to that part and there is an increased activity, because there is an injury there, and while they are destroying the micro-organisms they are also manufacturing a substance that will prevent toxic effects, that is the substance manufactured in the tissues through disorganization of inorganic cells. It is a well demonstrated fact that if you inject a normal saline solution it will prevent the toxic effects that result from an injury So it is a matter all along of forcing into our bodies the substances that are injuring it, and if they are allowed to remain in the intestinal tract for four hours substances that should be eliminated will be formed there. Dr. Hartzell said you exhale this in the breath. Those accumulations are not exhaled in the breath. They do not come from the lungs.

He also said the terminal ends of the blood vessels were the cause of pyorrhea. I do not see it in that way. God has made man in the image of Himself, and then He put some little blood vessels in the peridental membrane so as to catch all those waste products. Why doesn't that waste go somewhere else? I do not think such things are possible. We may know nothing about it from what we see in the body in its normal condition, and what brings about the abnormality? I say it is an external cause and not an internal one, and if it is true that these waste materials are carried to these ends and deposited there and cause an inflammatory process, then our study of pathology is based upon a wrong foundation and we will have to assume another position. Of course, it is only about twelve years ago that we began to think about this matter of autointoxication, and the man who first gave it a name has never studied up on it very much. He has rather taken backwater, and does not say anything about it. So I believe we must come to the original proposition that such diseases in which we find an inflammatory process are due to some external causes, and that external cause may be bacteria, may be a difficulty back of bacteria; so the thing that is able to act upon that tissue exists as the predisposing cause and comes from some other source than the tissue itself. So I think we will come to a certain conclusion, and I am going to state it now, that within ten years from now pyorrhea alveolaris will be no more or less than a local infectious condition, recognized and treated as such, but will be due to a predisposing cause and it may be due to the fact of susceptibility to it. Here we have a special tissue, specially organized, acted upon in some way, and it must be from an external condition. Cows have hollow horn, but it is not due to some condition within the horn. It is due to a fungus which acts upon that tissue, and you can produce that same condition in other cattle with that fungus. You can only produce it upon a horn scraped and used as a medium, and about 22 per cent of those animals have hollow horn from inoculation. So it will not grow except in certain tissue. I believe that pyorrhea and various other diseases are mainly due to no other cause than predisposition, and that is brought about by the law of atavism. I do not believe it is due to the condition of the intestinal tract principally, but it is due to that condition when micro-organisms have found a habitation and change the formation of the tissue cell.

TENTH ANNUAL MEETING OF THE INSTITUTE OF DENTAL PEDAGOGICS, DECEMBER 29, 30, 31, 1902.

DISCUSSION OF PAPER BY DR. J. M. PATTON ON "TEACHING PHYSICAL DIAGNOSIS."

R. H. **Hofheinz**, Rochester, N. Y.:

The paper expresses my own views so closely that, even if I were well enough, I could not add much to it.

There are some things in education which must be trusted to the individual judgment of a pupil and tend largely to his intellectual development. There are other things that summarize the results and become a part of memory. There are some things which, however, can only be studied by demonstration; yes, by actual contact. Among these belong the study of physical diagnosis. The student must commit the act.

Anything that will add to the broadening of dental education and its naturally good results should be joyfully accepted by all earnest minds in the profession. If anything new is to be added to the dental curriculum of the present time physical diagnosis is the branch which is mostly needed. Though the period in which most of the dentist's time was consumed in extracting teeth is of the past, anæsthesia will ever remain a necessity in dental practice.

I have always argued that a dentist should not trust his own diagnostic ability regarding the patient's heart and lungs, and, therefore, never give anæsthetics without consulting a medical practitioner. Why? His professional training did not equip him with the familiar sound of a normal or abnormal heart, nor was he generally able to diagnose complications in the breathing apparatus of his patient.

With this branch taught in college, the dentist possesses every reasonable qualification to anæesthetize his patient and bear the scientific and moral responsibility of a possible accident. It is, however, not only for this purpose that physical diagnosis should be taught. Dr. Peck well expressed it in his paper before the American Medical Association when he said: "I hope to see the time when a dentist will inquire into the health and symptoms of his patients before deciding on the amount of work that is proper and safe to be done at any one sitting, as should a physician before prescribing a certain amount of a drug that is to be given a patient." Yes, indeed, this is an essential necessity. How many patients are kept away from judicious and timely dentistry because the last operator lacked all judgment regarding the patient's physical endurance. We may go beyond that. How many dentists fail in diagnosing their own physical ability? How many laborious operations do we begin with brilliancy and end with mediocrity? Why? Because we have failed to recognize our limitations—failed to recognize our own physical status at that particular time. Many fine minds and hands have been made passive because the owner lacked a fine, discriminating power of physical diagnosis regarding his own and only corpus.

Under the present three years' course of study but little time will be left for the teaching of physical diagnosis. I have no doubt, however, that the coming four years' course will give sufficient room to a branch of medical science which is as essential to a practicing dentist as physiology. Prophylaxis, which in future will form one of our greatest functions, will change the requirements of the dentists of the past; but though the future dentist may be called upon to less frequently use anæsthetics for dental operations, may be less called upon to perform the long and exhaustive operations of the present time, he will be more called upon to use a broader and more comprehensive knowledge of the medical sciences.

The paternal branch of medicine from which dentistry emerged will assimilate this ramification again as soon as dentistry modifies its frequently alarming showy technics and becomes based on science and prophylaxis only.

DR. T. B. HARTZELL, Minneapolis:

MR. PRESIDENT AND MEMBERS OF THE ASSOCIATION:

It is an honor and a privilege to discuss this able paper presented by Dr. Patton. His views, so clearly presented to us, must meet the approval of every dental teacher who has given this subject consideration.

Personally, I thoroughly believe in the ideas presented, and only differ from the essayist as to the scope of the field physical diagnosis should cover. In view of this fact, I will not occupy your time further than to commend the paper and to suggest wherein we can make physical diagnosis of still greater value to our dental students and to the profession.

As one reviews the thought presented by Dr. Patton, one is impressed by the fact that he limits the field of physical diagnosis to its application in anæsthesia and one would also infer that to be able to fairly judge of the condition of the circulatory and respiratory system covered the most important ground of value to us. His idea seems to be: Investigating the blood, only so far as relates to the exhibition of anæsthetics, dismissing the kidneys with ordinary chemical analysis of the urine, and, while he does not so state, I infer such analysis is undertaken for its bearing on anæsthetic work alone.

Now, while every idea presented, without exception, is good and valuable, I certainly think that the field of physical diagnosis is of far greater scope, and the branch must and will be taught in many schools, and is taught now in a few, in such a comprehensive way that the student gains a conscious power and ability to be vastly more useful in his profession than if this branch is taught only for its bearing on general anæsthesia.

Dental teachers are more than ever awake to the fact that from 30 to 50 per cent of teeth lost by the American people before the sixtieth year of life are lost from causes other than caries, and that systemic conditions exist which account for this loss is equally true; therefore, sufficient general pathology should be given the student to pave the way for comprehensive teaching of diagnosis of these conditions.

For instance, the student should know sufficient physiology and pathology to comprehend the significance of variation in specific gravity, color, percentage of urea, total number of ounces of urine eliminated in twenty-four hours; also the significance of the presence of sugar, albumen or casts.

The time is coming when internal medicine will recognize in œdematous gums a more valuable diagnostic sign than the presence of fluid in the areolar tissue under the orbit, because it is a more delicate symptom and earlier makes its appearance than does the second condition, and just as surely points the searcher to the vital fact to be taken account of—namely, imperfect elimination of waste products which the kidney should convert and remove. Right here I might emphasize the fact that in anæsthetic work the condition of the kidney as regards its health is almost, if not quite, as important to the anæsthetist as is the condition of heart or lungs, for who has not seen acute uræmia follow the administration of ether occasionally? The students of the future must be taught these things to gain the greatest success.

The diagnosis of pathological conditions found in the oral cavity due to faulty elimination of the products of metabolism must and will receive greater attention in our coming four-year course. The investigation of the saliva for its diagnostic value is particularly in our field; should we not profit by it?

The investigation of the blood has helped us to valuable knowledge and will help us to more if we take advantage of such investigation; and think for a moment how much physical diagnosis along dental lines owes to the microscope? I will not stop to enumerate, for I know you agree with me that our field for physical diagnosis extends beyond the limits set by the essayist.

The relation diseases of the stomach and bowels bear, also the relation that acute febril diseases bear, to the development, existence and loss of teeth presents an interesting field for diagnosis, and one in which progress has already been made, and a field in which medicine can learn much from us. Our knowledge of anatomy, physiology and pathology of the nervous system is being so correlated with physical diagnosis that it is of great value to us in some of our most perplexing problems. For to fairly judge of the condition of the nervous systems of the people who come to us for service and to govern our actions thereby is of greater value to our patients than many of the things now taught, and should receive more attention in our course.

The diagnosis of contagious diseases, particularly of syphilis, is of vast importance, for the safety of both patients and dentist depends upon its recognition and the observation of rigid prophylaxis.

How many of you here present would care to trust yourselves or your families to the care of a man lacking the ability to diagnose this phase of disease, foryou would be apt to argue that lack of ability to recognize would entail faulty prophylaxis.

The fact of the matter is that our men should be so grounded in knowledge of disease and diagnosis as to enable them to take stock in the general condition of the patient, and of the special conditions directly affecting the teeth, more thorough and careful training than even medicine can give.

The man who limits his practice to operative and prosthetic dentistry is from one-half to two-thirds a dentist, and our coming four years' course will in many schools afford instruction that will supply the missing third, and I trust the whole weight of influence of you men who are our leaders in dental progress will be given toward the rounding out of this part of a dental education.

Dr. D. R. Stubblefield, Nashville:

The Institute of Dental Pedagogics should deem itself fortunate in being able to enlist men who can so intelligently and scientifically discuss a question as the essayist in this case. As an individual member, permit me to thank him for the privilege of hearing his timely and agreeable disquisition. He has been governed by the time-honored maxim, if I may copy him in quoting wise saws, that "what is worth doing at all is worth doing well," and right well has he done it. He has given us a logical, concise, yet thoroughly comprehensible exposition of his subject, and as one who has had the opportunity of thoroughly digesting it, I wish to suggest to the membership the propriety and expediency of reading it over more than once when it shall appear in our transactions. It will repay you abundantly.

For these reasons, as well as others not so obvious, a discussion by me must be largely a corroboration and hearty approval. "Regarding the propriety of teaching physical diagnosis to dental students," he says, "there appears to me but one conclusion, and that is that it is not only proper but absolutely necessary if we are to educate dentists who are capable of not only administering an anæsthetic properly but who also (should) have some judgment as to the propriety of its administration in the individual case." All must agree with that, if the dignity and worth of dentistry is to be maintained. That its study and full comprehension should not have been deemed essential from the outset of all effort toward dental instruction is not only a reflection upon the founders of institutions so intended, but is also quite remarkable. The institution with which I am most familiar, claimed from its inception to try to teach in its curriculum everything vitally necessary to a proper educational equipment of practitioners of dentistry, and yet I am certain physical diagnosis, as such, has never been extensively offered. All dental colleges, I feel assured, teach and have always taught a technical physical diagnosis. A differential dignostic skill is absolutely essential in the daily routine of every intelligent dentist, and the man who doubts this merely publishes his own ignorance of our profession.

It seems entirely a work of supererogation to discuss the propriety of its being taught, and the questions only remain as to how far we ought to go, how much we should strive to accomplish and in what way. It is all but axiomatic that if a dentist ever does give an anæsthetic at all he sould know what is essential to qualify him for such an operation. The surgical procedure may range from minor to major, but anæsthesia never falls below the plane of its highest possibility and should never have degrees of comparison in the mind of a conscientious operator. Again, it is equally certain that every dentist, especially those outside of the realm of the extracting specialist and therefore the expert anæsthetist, has to exhibit general as well as local anæsthetics more or less frequently in his work. Therefore, it goes without saying any instruction short of complete instruction is not enough, and does not accomplish the end aimed at, as the reason for its existence in any degree whatever. Diagnosis means known throughout, and any partial knowing is only that degree that has been rightly termed a dangerous thing, and should never be tolerated where drinking deeper is possible and better. My personal conviction is that an ideal can never be too high, for there never is growth and development without stretching in mind, morals or muscle. If there is any mistake made in our work it behooves us to make it by attempting to attain higher than reasonable demand. But whatever is decided as to the degree of proficiency to be attained, I think this subject will be one of the most valuable additions rendered available in the four-year regime now at hand. It will constitute one of the most important links in the golden chain of a thorough dental education.

Again, the essayist declines to raise his voice in argument against those who maintain that the "latter faculty," as he calls it, meaning full instruction, is beyond the possibilities of an education in dentistry, but I have no such compunctions or hesitation. Why should dental schools hesitate to attempt in four years of seven months each, what medical schools claim to teach in four years of six months each? Can they claim that their material is better, better educated and more mature than is the average found in the schools of the National Association of Dental Faculties? Has it ever appeared that any educational requirement is obligatory before matriculation is possible in even the best of our medical schools? No, no such superiority exists in material to be worked on and must be found in a better or more thorough method, if found at all. Indeed, we have a right to claim that our higher fixed educational requirement gives us a better chance to produce good results. Be that as it may, the fact remains that to teach this subject well requires that specially selected clinical material be procured. It will be difficult, but not insuerably difficult. It is no easy matter for medical schools to do it, with all their outside clinic to draw from, but there is no patent right on poor, sick folks that I am aware of, and every dental faculty can command the situation if it wishes earnestly enough to accomplish things. Without posing as a prophet, I will venture to predict that such perfect practical results will be shown from those schools that survive the strenuous life the four-year rule will usher in, and each institution present could, if modesty did not prevent, disclose one of those fittest to survive.

The question is, how far shall we attempt to go in the matter? I fear that all will not agree with me in saying, the farther the better, but that is my unalterable opinion. Our essayist has made a most clear-sighted and judicious limitation, and I shall vote to endorse his views as the next best measure. Nevertheless, it occurs to me that the man who can have but little daily opportunity in after life to become proficient in such an important equipment, should, as a student, get the best possible training at college. The medical practitioner enters a school of physical diagnosis the day he commences to practice, and he should become more expert as the years go by, which is in direct opposition to the condition of the dentist, who will be compelled only occasionally to attempt an exhaustive physical diagnosis. Therefore, I repeat, that just as the dental student is given the basis for differential diagnostic skill in the special domain of his own work in the four sessions, it is not beyond reason to assume that he may be taught physical diagnosis more generally and just as thoroughly in the same time if the requirement is made. That he should not be called upon to make a critical differential diagnosis as often as the physician, or that he should not be called upon to make one at all, is no argument against the wisdom and safety to his clientele that would be found in his ability to do so if it were suddenly demanded of him. A practitioner of either medicine or dentistry, unlike a chain, is to be measured by the highest possible demand in his calling, his strongest instead of his weakest link, as it were. Having come into dentistry by the doorway of medicine, I have always been unable to look upon my calling as less important than the practice of medicine in any of its special branches and any view of its essential demands has never fallen short of the widest possible culture. Too long has the world at large been given, directly or indirectly, a narrow view of the importance and dignity of dentistry, and this idea will never receive its absolute quietus until the question has been settled in the breadth and thoroughness of the scientific qualifications found in our curricula.

Dr. A. H. Peck, Chicago:

I am glad these three gentlemen have preceded me for it leaves little for me to say, and I have never been anxious to discuss any subject unless I had something new to present. I am gratified, however, that the subject of physical diagnosis commands the attention of the dental profession in connection with our college work that it does. As I stated before, this is a subjcet that has engaged my attention for a long time and, if you will permit me to repeat, ever since I have been teaching in dentistry I have harped upon this subject. I believe that there is nothing in connection with the equipment of the dentist, in the broadest sense of the term, that is more essential than an intelligent understanding of this subject. The ability to diagnose accurately local conditions, and also conditions of a systemic nature upon which many local pathologic conditions depend, is one of the most important of our qualifications and I am glad that a number of our colleges have considered this subject of sufficient importance to give it a separate place in the teaching force, and I hope that in the very near future all of the dental colleges will give this subject the place on their curricula that it deserves.

As Dr. Hartzell says, I would differ only in the scope of the application of this subject in teaching dental students. While I believe that it is impractical at the present time to undertake to give a course to dental students in this subject, as broad and comprehensive as the course that is given to the medical students, yet I do believe that such a course is exceedingly desirable, and if it were possible, considering all the conditions with which we have to deal today, I should most certainly heartily support any movement which has in view the inauguration of a practical course in physical diagnosis. It is very essential that the dental student leaves his college with a mental equipment in physical diagnosis that will compare favorably with his knowledge in any other subject.

Dr. W. H. Whitslar:

An amount of physical diagnosis of dental patients under varying conditions is a necessity. This is especially true when the candidate is to be a subject of anæsthesia. It is well to understand some of the means of arriving at the diagnosis of disturbances of the heart and lungs. A short course in our curriculum is desirable and this, I believe, should be largely illustrated with manikins first, to recall the anatomy of the vital organs, then to localize the organs. Afterwards the human subject may be secured from the clinics and the student taught to recognize usual and unusual sounds of the thorax. In so far as the teacher is able to secure subjects, so will the value of the course increase. It must be averred, however, that physical diagnosis of lesions of the heart and lungs is not to be mastered in a short course. When cases in practice present themselves, however, that are eminently suspicious, that fact is all the more observant to the mind that has had some training, be it ever so little. This course should be clinical as much as possible.

There is another phase of this subject that seems to me sufficient to command attention under another chair. I refer to the examination of patients entering the operatory for the usual dental operations. While it often seems impracticable to devote much time on the part of students to the incoming patients as a body, yet I have had for a long time the desire to have systematic examination of every patient that enters the college. Many things are attained by such procedure. As a rule the patients are examined by a demonstrator, and he assigns them to respective operators, where mechanical affairs precede all other thoughts. Now, in the hands of a demonstrator, in a examination room for the whole purpose of examination, a student learns to receive a patient, seat him, observe temperament, condition of health, conformation of jaws and face relative to the teeth, mucous membrane of the mouth and throat, abnormal growths, presence of calculus upon the teeth, gingivitis, pericementitis, abscess and fistulæ, other pustular diseases, decayed teeth, and many other conditions that an intelligent demonstrator could teach the tyro to become observant, inquiring and intelligent. In this study the act of palpation would help the diagnosis of an abscess, and percussion the resonance of the tooth indicating its vitality. The senses of sight and smell are also called into use.

On the whole, I think that the establishment of instruction in diagnosis is of so much impotance that it is a wonder that it has not been introduced heretofore.

Dr. Faneuil D. Weisse, New York, N. Y.:

The teaching of physical examination to dental students was commenced at the New York College of Dentistry about ten years ago. At that time a class was organized which every student of the second year has since been required to attend. It seemed to us that it was absolutely necessary that a dental practitioner should be able to recognize the normal pulse, normal heart sounds, and normal lung sounds; but, that it was not necessary that he should know how to differentiate abnormal heart and abnormal lung sounds. If he was able to determine that the pulse, the heart sounds or the lung sounds were not normal, it would deter him from administering an anæesthetic and lead him to direct the patient to his or her family physician for advice as to the propriety of administering an anæsthetic.

This class has broadened, since its organization, in that the class work now includes the practical demonstration of and drill in the application of measures to be carried out in the emergencies of syncope ,asphyxia, and hemorrhage—the dental surgeon should be educated to met these emergencies—in addition the students are taught the application of bandages to the head.

Each class consists of ten students, who examine and operate upon each other; the instructor of the class is a physician.

First—How to feel the pulse is demonstrated, what is to be recognized as the normal pulse and its age variations are noted. Each student then examines the pulses of his fellow students under the guidance of the instructor.

Second—The examination of the heart is demonstrated, and what is to be recognized as normal heart sounds is described. The students then examine each other—they being stripped to the undershirt.

Third—The examination of the lungs is demonstrated and what is to be recognized as normal lung sounds is described, and the normal ratio of the pulse to the breathing is given. The students then examine each other—they being stripped to the undershirt.

Fourth—The administration of an hypodermic injection is demonstrated, and each student administers an hypodermic injection of sterilized water to a fellow-student. The several drugs used for hypodermic injections are then enumerated, and the special indications for the use of each given.

Fifth—The subject of hemorrhage after extraction is dealt with; the various measures resorted to are enumerated and their applications described.

Sixth—The various methods of artificial respiration are demonstrated, and the students are drilled in practicing each method upon eath other.

Seventh—The application of head bandages is demonstrated, and the students are drilled in applying them to each other.

Eighth—The treatment of syncope and shock are described and measures to be resorted to given.

A written examination is passed on the work done and the passing average is 75 per cent.

Dr. L. C. Borland, Chicago:

I was very glad, indeed, to hear Dr. Weisse's remarks on this subject, as I have been trying to carry off the credit of having introduced this great controversy among the dental profession. I first advocated the study of the heart and lungs by dental students about ten or eleven years ago. My object was to try and interest them in the heart, which they were compelled to take up in the dissecting room. Some seven years ago I brought to the college during the annual clinic two boys, one having a normal heart and the other an aortic stenosis. I had combination stethoscopes, so that ten or fifteen could listen to the sounds at the same time, and as the members of the dental profession passed through the room I asked them which of the two cases they regarded as the normal and which the abnormal; to which of the two they could administer an anæesthetic in safety. I was astonished to find how few of these men were able to distinguish between a normal and an abnormal heart. That may be taken as an evidence of the necessity of a course in physical diagnosis, at least so much of it as is of service and necessity to the dentist.

Dr. Patton (closing the discussion):

The advisability of teaching this subject appears to be admitted. As Dr. Stubblefield remarked, perhaps it was a matter of supererogation to introduce that question at all. I did not introduce this matter of teaching physical diagnosis because I thought there was any doubt in the mind of the dentist as to its place on the dental curriculum, but because there was such a doubt in the mind of the medical man. They think that the dentist should not be taught this subject because we cannot teach him enough of it in the short time placed at our disposal. I do not feel that way; I feel that the dental student can learn it and that he should be taught it, and that it will do him much good.

As to the question, how much of this subject should be taught: As I stated in my paper, I consider the subject from the standpoint of the administration of anæsthetics, but that is not the whole subject of physical diagnosis. A great deal more might be taught in the dental schools that would be of benefit to the dentist. The question is whether you are shaping your curriculum for the purpose of making a dental practitioner, or whether you intend to make a research worker of him. I do not believe that it is advisable at present to require every dental student to take a thorough course in physical diagnosis, including diagnosis of the urine, blood and all the secretions. Certain portions of diagnosis coming under the head of clinical diagnosis should be taught, and this should be done in the laboratory before the student reaches his course on physical diagnosis.

I think that the dentist should be educated to the point where he is able to determine if there is something wrong about the patient; knowledge that is of value in reference to the amount of dental work to be done on that patient; on the question of the advisability of giving an anæsthetic, or which anæsthetic, or how much of it should be given. Such a knowledge is of practical value to the dentist in his every-day work.

I have confined my paper to the question of physical diagnosis of the various organs in relation to anæsthesia, because I believe that is the most practical point from the teaching standpoint today. I believe with Dr. Borland that those methods should all be objective. You can talk to a man for a week about a heart murmur and yet he will not know what it is. But show him that murmur, let him hear it, and he will know all about it in five minutes. I showed a patient to a medical student the other day; the student had been studying physical diagnosis for two years. I demonstrated a common point in a mitral lesion of which he had no knowledge other than the theoretical. In two minutes I gave him the necessary practical knowledge. That shows you the difference betwen practical and theoretical teaching.

The presence of a heart murmur has nothing to do with the administration of an anæsthetic unless there is some condition of the heart muscle which would contra-indicate the use of an anæsthetic. It is entirely a question as to the integrity of the heart muscle and that is something that you cannot teach the dental student, or any other student, in four years. He is lucky if he learns it in twenty years; that is, with any degree of proficiency. What the dentist should learn is to differentiate between conditions or murmurs; what a heart murmur is, when you can hear it, where it can be heard and how. He should learn that it is present and that is all. He has nothing to do with the decision of the question whether that murmur will interfere with the administration or not. That is beyond his scope.

DOMESTIC CORRESPONDENCE.

NEW YORK LETTER.

To the Editor of The Dental Review:

Usually none of the New York dental societies holds any meeting in June, but this year the "Institute of Stomatology" broke the rule by holding a regular meeting on the 2d at the "Chelsea," 222 West 23d St., Manhattan.

About fifty sat down to dinner at 6:30. Following this at 8 o'clock came the evening meeting, the President, Dr. J. Morgan Howe, in the chair.

Under the head of "Communications on Theory and Practice," Dr. L. C. Bryan, of Basel, Switzerland, presented by letter two very interesting incidents. For sensitive cavities he introduces carbolic acid *warmed,* a piece of cotton saturated with acid and slightly warmed is introduced into the cavity. A second piece being already moistened with acid and on the operating table, a large steel burnisher is warmed and this second piece of cotton picked up with it and placed in the cavity. The patient is able to bear the heat coming *through* this moistened cotton.

His other idea was locating an abscess and determining the length of the fistula or sinus by introducing a long cone of gutta percha dipped in carbolic acid and pushed in. The patient being allowed to press the gutta percha point, will surely stop when pain is caused. By this means the abscess is definitely located, and the length of the fistulous tract, and carbolic acid or any other medicine may be applied in the same way, exactly at the seat of trouble.

Dr. Charles Otis Kimball described a case which had come under his observation which he declared to be actual malpractice. The patient had been advised to use a *very* soft tooth brush, like camel's hair, and only once a day, because the gums were too sore, according to his adviser.

The trouble was that there were extensive deposits of calculus which should have been removed, the presence of which had been entirely ignored by the dental adviser. Its removal obviated all difficulties.

Dr. L. C. Le Roy emphasized the fact that this case was an instance of gross malpractice and cited a case somewhat similar where the dentist went further by recommending that those cavities at the gum line (calculus and stains) be filled, and actually did prepare cavities in healthy teeth and fill them.

Dr. George Emery Adams, of South Orange, N. J., read a paper entitled "Treatment of Children's Teeth," which was very well received and provoked lively discussion, all agreeing with the general idea as set forth by Dr. Adams, of preserving children's teeth and giving the little ones the full benefit of our knowledge. Dr. Adams referred to an old manuscript—printed *sixty-four* years ago, in which, among others things, the improper extraction of deciduous teeth was spoken of as one of the prime causes of irregularities.

Following this was a brief paper by Dr. F. Milton Smith entitled "Suggestions Regarding the Obligations of the Dentist to Himself," in which the genial doctor told us how to conduct ourselves and our practices in a proper manner. Among other things he said: "A dentist ought never work longer than seven hours each day, and should always take from one to two months' vacation."

Dr. Smith always writes as he talks, right to the point, and is sure to "hit the nail on the head" more than once before he gets to a finish. Better read his paper when it is published in the *International Dental Journal*. It is worth reading and reflecting upon.

At a gathering of the members of the Institute recently, a very interesting little paper by Dr. Lyman Curtis Bryan, of Basel, Switzerland, elicited much encomium. Its title was "Prophylaxis, Extension for Prevention, or Extension of Prevention." Dr. Bryan said in part, that "most of our best patients call at regular periods, but still with mathematical precision we find cavities, then finally pyorrohea with its varied sequences, then possibly more cavities. Then we practice extension for prevention, we fill those surfaces, but—there are at least five other surfaces." Of extension of prevention, or prophylaxis, he wrote at some length of the work of one with whom we are all familiar, opening his paragraph thusly: "But, an apostle sprang up in Philadelphia." Dr. Bryan seems to think that Dr. Smith is the "real thing."

"There will come a time when decay of teeth will be arrested (Dr. Smith says he has reached it). Nitrate of silver does stimulate and arrest decay." The best treatment for most children's teeth is to bathe them in a 40 per cent solution of the above.

Dr. Bryan says he advises some patients to pay an annual sum for the care of their mouths, which presumably includes all characters of operations.

In the discussion which followed Dr. H. W. Gillett took exception to Dr. Bryan's inferences. He said he was not able to get away from Dr. Bryan's first paragraph. He does not believe that decay of teeth is increasing or that we are not able to combat it. "*If* my patients came to me with their teeth in that state, I would not feel that I was able to do my duty."

A few incidents of office practice were given at one of the meetings last month. Dr. E. A. Bogue described his process of bleaching discolored teeth. His first procedure is the closing of the apical end of the root with oxy-chloride of zinc and cotton. Then oxalic acid is applied and hot air, after which dry chalk is packed into the canal and left over night, repeating if necessary. Finally pyrozone, 25 per cent, is applied until the color returns. The canals, etc., are then dried, the inner surface of the cavity covered with copal varnish, over which oxy-phosphate is placed.

Dr. J. Morgan Howe spoke of a case of erosion where he had filled the molars on one side of the mouth to open the bite. The patient was taken sick just at this time and was absent two months and a half. When he came back the molars on the other side of the mouth had come together, so he lost part of that operation.

No more Greater New York or Metropolitan district meetings will occur until October. But meanwhile the New Jersey State Dental Society engrosses attention at home—July 18th, at Asbury Park. The National Association at Asheville, N. C., is close behind that, and there are others. No use telling you about the Jersey meeting. Your next number comes to hand just about as they meet. They will have a *great* meeting, and if you western boys want a good time at the sea shore, come and meet Dr. Frank L. Hindle, the President. He has left no stone unturned to make it a success, and he will give you a good time, too. Yours truly,

THE BOROUGHS.

REVIEWS AND ABSTRACTS.

THE PHYSIOLOGY OF MASTICATION, AND KINDRED STUDIES.—By J. Sim Wallace, M. D., D. Sc., L. D. S., Hon. Dental Surgeon West End Hospital for Nervous Diseases, and Assistant Dental Surgeon National Dental Hospital, W. Published by J. & A. Churchill, London, and P. Blakiston's Son & Co., Philadelphia.

This little brochure of 32 pages is made up of papers previously published by the author in journals, and includes, beside the one giving the title to the book, such subjects as "Some Effects of the Refinement of Food," "The Prevention of Irregularities of the Teeth," etc. There is much good common sense in the book, and some very vigorous thinking. The author makes a plea for a diet containing a goodly quantity of fibrous food, not only because of the necessity for extended mastication, but also because "the stomach and intestines are supplied with that more or less in nutritious matter which is necessary for the healthy performance of their functions." He argues against the present tendency toward the refinement of foodstuffs on the ground that it deprives the food of the chief quality which is calculated to induce the full function of mastication.

DENTAL MATERIA MEDICA, THERAPEUTICS AND PRESCRIPTION WRITING.—By Eli H. Long, M. D., Professor of Dental Materia Medica and Therapeutics in the Dental Department, University of Buffalo; Professor of Materia Medica and Therapeutics in the Medical Department, University of Buffalo; Assistant Attending Physician to the Buffalo General Hospital. 321 pages. Illustrated with 6 engravings and 18 colored diagrams. Cloth, $3.00 net. Published by Lea Brothers & Co., Philadelphia and New York, 1903.

A careful perusal of this book reveals the fact that the author spared no pains to make it a comprehensive text-book for dental students. It will also make a valuable addition to the library of the general practitioner.

The classification of remedies is an important feature, and while heretofore it has seemed to be extremely difficult to group remedies according to their action and application, we believe the author has arrived at a happy solution of the problem. The definitions are descriptive and simple and the chapter on prescription writing, while not absolutely necessary from the standpoint of the dentist, is a valuable adjunct to the book.

On the whole the work is recommended, containing as it does much information which is valuable to the dentist. G. W. J.

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, THE DENTAL REVIEW, 55 State Street, Chicago, Ill.]

To Prevent Bands for Regulating Appliances and Clasps from Changing Shape When Polishing:—Fill the bands with modeling composition, chill, and remove surplus with a sharp knife.

Indianapolis, Ind. J. Q. BYRAM.

Repairing an Engine Cord:—Insert the ends of the broken cord into a piece of hollow shoe string, bringing the ends in contact in the center. The joint can now be made firm by sewing with a needle and thread, care being taken to wind the ends very tight. This makes a neat splice and one that will run smooth over pulleys.

Freeport, Ill. E. L. Griffith.

An Investment Material in Porcelain Work:—

Powdered Silex	Each one part.
Powdered Asbestos	
Plaster of Paris	Two parts.

Mix well.

Indianapolis, Ind. J. Q. Byram.

Importance of Investing Bridge Work Prior to Removal from the Model:—Never attempt to remove a bridge from a model—after having assembled the parts and finished waxing them in position—unless it is well invested on the buccal or labial and occlusal surfaces. A matrix is thereby secured, into which any of the crowns or dummies that might become loosened in the removal can be replaced in their proper position.

After removal from the model a small amount of investment can be added and the piece made ready for soldering by removing the wax in the usual way, and proper preparation of fluxing the solder and heating.

This applies to cases where the abutments are completed before the dummies are assembled, as in a single Richmond or all-gold crown.

Springfield, Ill. Grafton Munroe.

Constructing a Porcelain Bridge:—In constructing a porcelain bridge, if one end of the bridge consists of a platinum shell crown over a molar, with the saddle and bar soldered to it, failure is practically assured.

I have had several porcelain bridges constructed on that plan for use in my own mouth, and in every case they have proved a *total failure.*

The platinum shell crown either splits open on the side where the greatest force of mastication is brought to bear, or the saddle and bar become torn away from it.

It is better in most, if not all, cases to cut off all teeth which are to be used for the abutments for the bridge, and make a strong cap fitting over the ends of the roots, with a good strong Iridio-Platinum post through the cap into the root.

A porcelain bridge constructed on this plan, using 25 per cent platinum solder, will assure success where success is possible.

Chicago. H. A. Cross.

* * *

The Hygiene of the Mouth Blow-Pipe:—Much attention is now given by physiologists to the importance of diaphramatic breathing, even to the extent of providing an apparatus to assist in its accomplishment. For fifty-eight years I have used the mouth blow-pipe and feel assured it has had much to do with my excellent health and entire freedom from colds, for I can say I do not know what it is to take cold.

The dentist who employs the little jeweler's blow-pipe finds it up-hill work, and many have told me they were never able to learn to use it successfully. The jeweler's blow-pipe is fit only for their use, as they require a delicate flame for low-fusing solders. It also must be held between the lips, tiring the muscles, and a steady blast cannot be obtained.

On the other hand, the dentist uses hard-flowing solders and has an investment to heat up and keep hot, which requires a large flame and a constant blast, making it necessary to use a larger blow-pipe with the mouthpiece pressed against the lips.

I find that students learn to solder more readily by using the mouth blow-pipe than with the automatic style where the bellows are employed, but in order to be successful with the former there must be a constant supply of air by use of the diaphragm.

Chicago. L. P. Haskell.

* * *

A Satisfactory Base Plate:—In the paper on "Taking the Bite," read by Dr. Goslee before the Odontographic Society and also in the discussion thereon, published in the last "Review," I have failed to notice a single reference to one of the best materals, I mean the best, at our command for base plates.

"Ideal base plate," and wax or paraffine and wax, with a slight reference by the essayist to sheet lead, seem to be about the extent of their resources in this line.

Is it possible that none of those present at that discussion have yet come to a knowledge of the almost perfect adaptability of vulcanized gutta-percha—not only for base plates, but trial plates as well?

Vulcanizable gutta-percha, mind you, not the ordinary red gutta-percha base plate. The former becomes stiff enough to retain its shape in the mouth, and will adhere as firmly as the finished plate—and by putting the teeth thereon with the same material, instead of wax, the trial plate can be taken home by the patient for observation, as suggested by Dr. Taggart, without the liability of loosening the teeth. It can be so easily and accurately adapted. Soften in hot water, mold to model previously covered with tin or lead foil with thumb and fingers, dipping model, with plate in place, one side at a time, until the whole is accurately adjusted.

If the patient uses much muscular force it may be reinforced with stiff wire as suggested by Dr. Goslee—though ordinarily not necessary at all. Then allow it to cool thoroughly before removing and trimming. After a little practice to get familiar with the working qualities of the material, "Ideal base plate," with its exasperating intractability and brittleness, will be relegated to the drawer devoted to "has beens" and—my regards to Dr. Taggart—there will be both "contentment and satisfaction"!

Alton, Ill. C. B. ROHLAND.

COLLEGE COMMENCEMENTS.

WESTERN RESERVE UNIVERSITY.

Graduates for 1903: A. A. Bates, C. C. Bachman, W. D. Bissell, L. N. Bundy, J. W. Culver, H. G. Decker, G. W. Douttiel, G. F. Doyle, F. A. Dunn, W. H. Dewey, P. H. Felger, A. K. Friend, J. G. Foltz, A. L. Griffis, D. C. Hahn, E. Hill, W. K. Hoch, E. J. Kocmit, B. W. Livingston, H. D. Lowrey, I. Lymon, C. E. Magee, L. A. Mapes, F. S. Manchester, R. E. Miller, K. D. Park, E. L. Pettibone, R. H. Ralston, H. S. Rogers, F. G. Rummel, O. F. Sickman, A. A. Smith, M. D.; H. L. Smith, J. E. Schultz, H. C. Standen, C. R. Thompson, R. L. Wilson, K. G. Worrell, J. S. Windisch, M. D.; N. J. Worley.

THE COLLEGE OF DENTISTRY, OF THE UNIVERSITY OF MINNESOTA.

Graduates for 1903: J. T. Ahlstrom, St. Peter; S. L. Conley, Cannon Falls; C. L. D. Amundson, St. Peter; M. F. Cook, Faribault; A. C. Bosel, Henderson; N. L. Davies, Minneapolis; J. H. Burns, Stewart; J. L. Day, Clinton Falls; J. R. Cain, West Concord; A. R. Foster, Winona; C. L. Cole, Fergus Falls; F. A. Frankoviz, Fergus Falls; L. R. Gholz, Roscoe; F. Pendergast, St. Paul; H. E. Goodspeed, New Richland; G. D. Smith, Minneapolis; H. C. Hektner, Mooreton, N. D.; C. C. Sparrow, Ortonville; G. E. Hourn, Minneapolis; W. J. Spring, Madison; W. C. Huestis, Minneapolis; J. F. Trench, Denison; G. A. Kuncke, Henderson; L. E. Tuck, Minneapolis; W. F. Lasby, Northfield; O. S. Werring, Sleepy Eye; F. E. Moorhouse, Minneapolis; H. W. Whitcomb, Rollis; G. J. Pattison, Herman; G. D. Williams, Willmar; E. F. Peterson, Minneapolis; O. B. Wood, Blue Earth; J. N. Pike, Lake City; F. S. Yaeger, Helena, Mont.

UNIVERSITY OF MICHIGAN, COLLEGE OF DENTAL SURGERY.

Graduating Class 1903: R. Allen, F. G. Anspach, E. E. Argetsinger, C. H. Baker, R. C. Baker, G. W. Baylis, S. Becker, M. M. Bennett, J. M. Brown, C. H. Borgmeier, C. J. Burke, N. A. Burr, M. D., Columbus Medical College; C. W. Clarke, R. P. Crawford, H. R. Davis, W. R. Davis, A. B., Hiram College; W. Durand, C. S. Eberly, F. T. Evans, C. T. Ferries, G. N. Finch, B. S. Gardner, R. B. Gatiss, J. B. Gibbons, E. O. Gillespie, K. E. Goette, F. A. Graham, W. M. Hawkins, C. P. Hildreth, W. S. Howlett, E. W. Johnson, L. J. Kennedy, W. W. Kimmel, P. C. Krupp, W. J. Larder, H. B. Lehner, W. A. Litle, F. C. Locklin, L. O. Ludlum, H. G. McCormick, A. W. McCredie, J. E. MacDonough, W. D. McFadden, J. B. McGilvray, H. H. Madigan, F. C. Mellish, H. J. Morrison, J. M. Osborne, F. Palmer, B. R. Parrish, N. W. Payne, N. E. Phelps, H. W. Putnam, A. Rickel, C. H. Robison, B. S., Michigan Agricultural College; A. D. Saunders, A. H. Savage, H. C. Sayrs, W. F. Setzler, F. E. Sharp, A. K. Steen, A. Stukey, P. Stukey, N. L. Swykert, I. L. Terry, G. B. Thuerer, H. L. Toney, B. S., McMinnville College; J. J. Travis, A. M. Traxler, W. A. Vance, Jr., M. C. Verburg, A. G. Wall, T. L. Watson, L. G. Welch, A. P. Whittemore, H. G. Wiggins, T. A. Wilhelm, C. J. Woodhams, F. R. Woods.

MEMORANDA.

Do not forget the National meetings at Asheville, N. C., this month.

AMERICAN SOCIETY OF ORTHODONTISTS.

The third annual meeting of the American Society of Orthodontists will be held on December 30 and 31, 1903, and January 1, 1904, in Buffalo, N. Y.

ANNA HOPKINS, Secretary, St. Louis, Mo.

Dr. D. C. White, dentist, who had resided in Alton, Ill., for fifty years, died after a long illness on June 10th, 1903. He was born in New Hampshire in 1822.

The proceedings of the Fifteenth Anniversary Clinic of the Odontographic Society of Chicago are delayed one month on account of failure to receive drawings for illustrating one of the papers in time for this issue.

MINNESOTA STATE DENTAL ASSOCIATION.

The twentieth annual meeting of the Minnesota State Dental Association will be held in Minneapolis, Minn., at the Dental Dept. of State University, on Tuesday, Wednesday and Thursday, September 1, 2 and 3. All dentists are cordially invited to attend.

GEO. S. TODD, Secretary,
Lake City, Minn.

COLORADO STATE DENTAL ASSOCIATION.

At the annual meeting of the Colorado State Dental Association, held in the Brown Palace Hotel, Denver, Colo., June 16, 17 and 18, many interesting papers were read, and clinics presented. The following officers were elected for the ensuing year: President, Dr. E. W. Varley, Pueblo; Vice-President, Dr. F. Y. Herbert, Denver; Treasurer, Dr. Wm. Smedley, Denver; Secretary, Dr. Harry W. Bates, 237 Majestic Building, Denver.

HARRY W. BATES.

HARVARD DENTAL ALUMNI ASSOCIATION.

At the thirty-second annual meeting of the Harvard Dental Alumni Association held in Boston, Mass., Monday, June 22, 1903, the following officers were elected: President, Charles E. Perkins, '90, Brockton, Mass., Vice-President, Arthur H. Stoddard, '87, Boston; Secretary, Waldo E. Boardman, '86, Boston; Treasurer, E. Proctor Holmes, '88, Boston; Executive Committee, Waldo E. Boardman, '86, ex-officio, chairman, Boston; William P. Cooke, '81, for two years, Boston; Harry S. Parsons, '92, for one year, Boston. WALDO E. BOARDMAN, '86, Secretary.

FALSE TEETH CHOKED HER.

Mary Mather, 89 years of age, was found dead in bed at her residence in Park Avenue, Ashfield, under peculiar circumstances.

She had been confined to her bed for two months, suffering from bronchitis, and a next-door neighbor, Mrs. Smith, was in the habit of visiting her at frequent intervals to render any necessary assistance. She saw the old lady at 1 a. m., and everything was then all right, but upon returning shortly after 6 o'clock she found her dead. Dr. Thomas, who had been attending the deceased, was immediately summoned, and he discovered that the woman's false teeth had fallen into her throat and choked her.—*Sydney Times.*

MISSOURI STATE DENTAL ASSOCIATION.

At the thirty-ninth annual meeting of the Missouri State Dental Association, held at Kansas City, May 19-21, 1903, the following officers were elected: President, J. H. Kennerly, St. Louis; First Vice President, F. W. Franklin, Kansas City; Second Vice President, F. H. Achelpohl, St. Charles; Recording Secretary, H. H. Sullivan, Kansas City; Corresponding Secretary, S. T. Bassett, St. Louis; Treasurer, J. F. Fry, Moberly. Place and time of next meeting: St. Louis, third Tuesday in May, 1904.

PATENTS RECENTLY GRANTED OF INTEREST TO DENTISTS.

727736. Obtunding attachment for dental drills, Claude R. Basford, Healdsburg, Cal.

737811. Dental swaging machine, Chapin F. Lauderdale, Milwaukee, Wis.

728048. Tooth brush, Charles A. Torrance and G. S. Stone, Talmage, Neb.

728375. Dental vulcanizer, Charles A. Davis, Pasadena, Cal.

728633. Dental plate, Samuel G. Supplee, New York, N. Y.

728638. Dental cuspidor, Henry E. Weber, Canton, Ohio.

728818. Dental manikin, Edwin P. Wright, Richmond, Va.

729740. Stand for toothpicks, matches, or like articles, Robert Dickson, Chicago, Ill.

730128. Saliva ejector, James B. Jordan, Nashville, Tenn.

729621. Dental suction plate, Ira Malone, Sapulpa, Ind. Ter.

730040. Fountain tooth brush, Henry C. McKinley and A. Diegel, Detroit, Mich.

730038. Dental dam holder, Daniel Murlless, Holyoke, Mass.

730184. Dental appliance, Ezra W. Witter, Medina, Ohio.

730658. Dental bite taker, David T. Huber, Des Moines, Iowa.

730379. Circuit-controller for surgico-dental engines, Joseph S. Letord, W. W. Alexander and H. Letord, Kansas City, Mo.

730714. Pneumatic apparatus for dentists or physicians, Paul H. Stehley and J. H. Hulings, Parsons, W. Va.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

Obituary.

Through the kindness of Dr. G. Alden Mills we are permitted to reproduce the following account from a daily paper of the death of a prominent New York dentist:

DR. E. P. HOYT DIES OF HEART DISEASE.

ONCE A PROMINENT DENTIST, RETIRED TO DEVOTE LIFE AND FORTUNE TO CHARITY.

Thousands of men and women in the Adirondacks, as well as in this city, where he has used his wealth in aiding the unfortunate, will grieve deeply over the death yesterday of Dr. E. P. Hoyt, of No. 17 West Thirty-ninth street.

Dr. Hoyt years ago was one of the best known dentists in New York, and through his business and other means accumulated a comfortable fortune, estimated by one of his friends last night as nearly a million dollars. He had not been in active work for a score of years. He spent his time and money in doing good where he thought it was needed.

During the last dozen years Dr. Hoyt was accustomed to spend several months every summer in the Adirondacks, where he helped to build churches. He aided many a struggling community to erect a suitable place of worship. He was the principal donor of the Presbyterian church at Stark, in St. Lawrence county.

His camp was near Cranberry Lake. When he first began going to the Adirondacks he met a farmer to whom he took a great liking, and later bought a piece of his property, on which he built an unpretentious log cabin.

He was practically alone in the world when he died. Since the death of a sister, a year ago, and of his wife, about three years ago, he has, he has told his friends, been waiting impatiently for the end. He was about eighty years old, and the cause of death was heart failure.

THE

DENTAL REVIEW.

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ORIGINAL COMMUNICATIONS.

THE POSSIBILITIES OF PROSTHETIC DENTISTRY FROM AN ESTHETIC POINT OF VIEW.*

By W. Warrington Evans, M.D., D.D.S., Washington, D. C.

The subject assigned me by your committee is one requiring more than ordinary care in handling, from the fact that prosthetic dentistry is the very foundation of all practical dentistry, and at the same time the "bete noir" of the profession. Known as mechanical dentistry it failed to receive due recognition, but when a few workers, ashamed to be known as mechanics, dignified the branch with the new name "Prosthetic Dentistry," it was brought into more prominent notice. The advent of bridge work and the advances made by the orthodontists have produced an enthusiasm for this class of work not only with the general practitioner, but also with the colleges, which are commencing to see their deficiencies in teaching this branch, and on paper at least, are trying to supply them. Progress is slow, however, as the capable men are few and the incapable majority do not care to admit the superior skill acquired by their more fortunate brothers. I should not say acquired, for this esthetic, mechanical skill must be born in a man. It cannot be acquired any more than we can change our temperament by environment. We can improve our condition but our birth-mark remains indelible.

The time has come when this branch must be recognized in its true importance, not placed at the head of the list at dental conventions, as section one, and brought up at the tail end of the meeting, when the best men are either gone, or have lost all interest in the subject, if they ever had any.

The just laurels at present showered upon the dental profession, are the result of skilled dental prosthesis. While I have a weakness for saying what I believe to be true, it makes me nervous to do so, and I fear for the result, yet I am proud to have been selected to represent this subject, especially in the city of Chicago, whose dentists, I consider to be the most advanced in this particular branch in the world. And I therefore hope for support from an intelligent standpoint.

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*Read before the fifteenth anniversary celebration of the Odontographic Society of Chicago, Feb., 1903.

My subject is, "The Possibilities of Prosthetic Dentistry from an Esthetic point of View." To intelligently discuss this subject, becomes an extremely delicate matter, and, as the physicians would say, we must first "remove the cause before we can treat the disease." As I am a sensitive man I do not care to be criticized too severely for telling the truth. But if by so doing I can open up a discussion that will redound to the benefit of the young men and this neglected branch, it will more than repay me for any personal discomfort.

In seeking out the cause of trouble we must go to the root and expose to view the germ that has been sapping the life from the noblest part of our profession, the germ that is to-day degrading the name of dentist in spite of the earnest men who are working so hard to place it on a pedestal. The fact is that four-fifths of the men bearing the same title that we do, are destroying more teeth in a day than the other skillful fifth can save in a year. And where do they get this license to destroy teeth? I regret to say from our colleges.

I will venture to assert that out of over sixty dental colleges in this country to-day, there is scarcely one of them teaching prosthetic dentistry as it should be taught. In the first place, the majority of the teachers in this branch need to be taught themselves, to be educated up to the practical requirements of a teacher, to be able to do the work artistically with their own hands, before their classes. Didactic instruction may do for all other branches, perhaps, but not for this one. Digital technic is what the teacher and student both require. The time has come when the Associated Faculties and the Institute of Dental Pedagogics should give this their most earnest consideration, instead of squabbling over petty matters. The journals have of late been collecting and publishing the biographies of the earliest practitioners in dentistry, and you will note the remarkable similarity in all those who were considered skilled, that they were either sculptors, artists, or mechanics, before or during their professional careers.

Several good articles on the subject have been published in the journals, within the last two or three years. The Institute of Dental Pedagogics actually had a paper on the subject last year which was discussed at some length. Dr. Molyneaux in discussing the paper closed his remarks by honestly admitting, "I will say that prosthesis is not understood; there is not a more staggering subject in the dental profession to take hold of." This is strictly true, and explains why the student does not care for the labor of acquiring it when he has no incentive.

The noble scientific men of the profession of to-day, who are laboring to place dentistry on a plane equal to medicine, will never succeed so long as they have so many degenerates in their fold. They do not realize what they have lost. They cannot understand that this despised prosthetic dentistry which they have been putting behind them, covers nearly every science and art of the universe. The manipulative skill of the sculptor is analogous with that of prosthetic dentistry. One reproduces, the other restores the "human face divine." The mechanic is essential to the artist. The mechanic may succeed without being an artist, but the artist cannot succeed without being a mechanic. Therefore this absurd nonsense from bright intelligent men mouthing over the word "mechanic" in relation to prosthetic dentistry only shows that their personal capabilities in this direction are weak.

The college faculties are becoming appalled at the ruthless destruction of teeth by ignorant men, and attribute it more to the lack of preliminary education on the part of the student than to the lack of professional education on the part of their teachers. But the latter is often the case, and the teacher who signs his name to a diploma, knowing full well, if he has a conscience, that he is not really capable of imparting practical instruction to that student, becomes morally, if not legally responsible for that student's criminal professional defects.

The question now is, how are we to raise this branch to an esthetic standard, if we daily trample it under our feet? At the present time scarcely one in a hundred of the so-called better class of dentists does any work in this branch with his own hands. They either do not know how and delegate this work to the laboratory men, or having a smattering of the mechanical part of the work, employ students and servants to do the work for them. They lack artistic taste and soul to appreciate nature. The laboratories are mechanic shops filling orders as directed, not dental offices of professional standing. And it is here that the dentist who does not understand prosthetic dentistry, tries to differentiate between mechanical and prosthetic dentistry.

The Associated Faculties made an advance step when they adopted a four-year term, but it remains to be seen how they will utilize this valuable time to benefit the student. If it is to be given up to scientific lectures that nine out of every ten students will simply cram to pass an examination on, and forget the next day, then it is unkind to say the least. But if the first year is devoted exclusively to laboratory technic of digital minuteness and mechanical expertness with copying from nature, the result will be a better comprehension practically, of the entire subject of dentistry.

How many dentists are complete failures simply because they lack constructive ability? And how many of our most fluent writers and speakers on the subject of prosthetic dentistry have disclosed to practical men their lack of ability to personally do the work under consideration?

I have noticed with pleasure the growing disposition of several late writers, to advocate the testing of students by preliminary examinations as to their mechanical as well as mental possibilities before they are accepted by the institutions. This is only just to both parties. The man who does not possess a reasonable amount of manual dexterity or mechanical ability, can never make a skilled dentist. Therefore you make his life a failure, and his name a disgrace to the college that graduates him, that has taken his money and wasted his time without giving him a just return.

A high moral standing should also be required, as without it you cannot expect either an earnest or an artistic student.

I would suggest that the entire first year be devoted to laboratory technic. First in the handling of tools, such as files, scrapers, engravers and jewelers' saws, etc; a round piece of wood, bone or plaster, filed into a perfect square, then a cube, finally a triangle. This sounds like a trifling thing, yet probably not one in fifty men in this room, can use the file true enough to cut these pieces into perfect shape. Dressing a block of plaster, square or round with the bench knife so it will be smooth and true is education.

Next, I am fully in accord with Dr. A. E. Webster of Toronto who so strongly urges the carving of teeth from clay, wax, plaster, ivory, or celluloid, with natural teeth as models, assisted by numerous drawings. This is much more essential in prosthetic technic than for operative work, for in the latter the natural teeth are intact sufficiently to restore without trouble, but the edentulous patient needs the dentist to understand the natural shape of a tooth or he cannot restore nature. Plenty of time should be given to this drilling at tooth carving.

Following this should be impressions of the mouth from fellow students, not from dummies, first in wax or compound until confidence is established, next in plaster, making into models and occluding.

The teacher should be constantly in attendance, examining the work from bench to bench daily to small classes at a time. Liberal illustrations of the work in hand should be conspicuously displayed on wall or blackboard, as also specimen technic work to copy from.

If any Anatomy is given in this year it should be confined exclusively to the head and mouth. Histology well illustrated is one of the most important studies in this year. More complicated studies in lectures should be dispensed with, or limited.

In the second year, while the technic is pursued step by step in the way of simple rubber cases, molding cases and general manipulation of metals for dental use, the didactic course of general Anatomy, Physiology and other studies should be brought forward. The third year general studies should be continued, while the technic is enlarged to more comprehensive infirmary and laboratory work of practical cases.

In the fourth year all medical studies should be dropped except oral surgery, while the didactic course in Operative and Prosthetic Dentistry and Pathology should be well illustrated and all the esthetic points of each study brought out. The technical work should be of the highest order from infirmary to laboratory, and every moment of the student's time he should be forced and stimulated to self-reliance and individuality. The teacher should be a man with a soul capable of being enthused with his work and also capable of transmitting that enthusiasm to his pupils. If the student is without a soul and takes no interest in his work except to obtain a license, he would never graduate from an institution of which I was the instructor of prosthetic dentistry.

Method and system are necessary in the early stages of training, but as the mind develops, so individuality should be encouraged. Give the student an idea of what you want to reach, then encourage him to work out his own problems. Grant premiums for originality in practical esthetic dentistry, as a stimulus. The assistant demonstrators should work in perfect harmony with the professor who in reality should be the chief demonstrator, to avoid confusion.

I prepared a paper on Dental Prosthesis for the National Dental Association in the summer of 1899, that I had hoped would come before that body for discussion, but it fared the usual fate of papers on this subject, was shelved for want of time, and while it was printed in the transactions, it failed of the purpose for which it was written. Some time later having been read before a learned ex-professor from Philadelphia he remarked that "he was astonished that a man of my intelligence should read a paper on such a subject in this enlightened age." Now the trouble with the age is, that we are moving too fast. We want to be men while we are still boys, and when we become old men we are sorry that we grew so fast.

Even our text books on this subject are lacking the intention for which they were written. One has virtually passed out of date, another should have done so long ago, while another is a compilation of a number of brains and naturally is confusing to the student to follow. A text book on this subject should be condensed, have all extraneous matter removed, be well illustrated with comprehensive drawings on the important subjects that will aid the student to understand the text, and have all unnecessary advertising dispensed with.

I believe it is still possible to educate and stimulate many dentists now in practice, if more interest in this section was taken at our conventions, and important single subjects taken up year after year, illustrated and discussed in a practical way. It would be an incentive to attract men who have no special taste for scientific matters.

Men must be grounded in the mechanical, practical pursuits of life before you can engraft into them esthetic culture. Manual training first, artistic and esthetic training after. The ideal of art is to follow closely the lines of nature. "Art that conceals art."

The less we have to study the more knowledge we obtain of that little. A thorough knowledge of general Anatomy is really unnecessary for the dental student. If we study facial and oral anatomy, as we should study it, and leave off the balance, we will acquire material for artistic and esthetic dentistry that is essential to its development. A perfect knowledge of the action of each and every one of these muscles enables us to retain or restore the soft lines of the face with which nature had originally endowed us. A smile is the severest test placed upon artificial dentures.

The subject of impressions, simple as it is, seems little understood by half the profession and but obsoletely described in text books. Model making shares the same fate and men fail to recognize that the model is the exact counterpart of the mouth, or should be.

Occlusion and articulation, volumes have been written on and yet to-day the profession at large is as ignorant upon the subject as they were forty years ago. In fact the same methods that were presented at that time in the old original text books have been handed down to this date, and yet we call ourselves progressive. How can you expect any possibilities in prosthetic dentistry so long as these things exist? They are the foundation of the subject.

Poor Dr. Bonwill struggled for years to get the dentists to understand that he had discovered something that could be of use to them, and they laughed at him during life, and extol him dead. So it will be I suppose with Evans. Dr. Bonwill's memory is deserving of much praise. The principle of his discovery is valuable as can be shown by demonstration, but it cannot be made a universal law, owing to the vast difference in size and shape in the human jaw, influenced by temperament. You cannot take such measurements and make them alike applicable to a lymphatic and a mental temperament. The proportions must be carried to suit the individual case.

We often read in journals and hear discussed at meetings criticisms on the porcelain teeth made by the manufacturers. If the few who are capable of judging what the form and color of an artificial tooth is, will only stop to reflect that the masses of so-called dentists do not know what the natural form or color is, they will have some consideration for the manufacturer and try to educate the ignorant dentist up to an appreciation of what he really needs. My observation and experience is that the manufacturers are ready to meet the demand as quickly as we can assure them of a reasonable return for their outlay. But so long as they can sell one or two hundred dollars' worth of teeth, snow white and the size of a rabbit's tooth to an ignorant dentist who will not have them any other way, and some of us who might appreciate a natural form buy five dollars worth, you see how it is.

While I am opposed to advertising any one firm over another, I cannot resist giving credit to the S. S. White Dental Manufacturing Company for their persistent endeavors to educate the dentists to a higher appreciation of the natural forms and coloring of porcelain teeth, through liberal illustrative pamphlets, etc. They have spent thousands of dollars in this work, and produced molds that are not appreciated. I have reference especially to the molds originally gotten up for celluloid, but which are applicable to nearly all kinds of dentures. They are by far the most perfect types in detail or imitation of natural tooth formation now upon the market, and are decidedly an advance step. But strange to say, the dentists as a majority, in their thirst for lucre, and with lack of proper education as to the natural correlation between teeth and face, are distorting nature in a most criminal manner, and ignoring the very means which would help them to improve their work, as well as their income.

It is not for the manufacturers to individualize our needs; they cannot do it, but they can furnish us with such forms as I have just mentioned, which are capable through the aid of the grindstone and the wonderful advance in ceramic art to change the form, add to, take from, and shade up, to meet every individual case presented to us. It is the art dentist who must do this, not the manufacturer. The age of production has gone ahead of the appreciative age of demand. We have within our reach every requisite for the possibilities of esthetic dental prosthesis. But we lack the ability to grasp it. We have been reaching after big things, and neglecting the little ones that make up life, art and science.

I have a few of these little things in Dental Prosthesis that I shall be pleased to show any member present who will care to look at them, and explain as well as I am able their construction.

I ask pardon for speaking so much and so strongly as to the deficiencies and lack of interest in our colleges, but having been a teacher myself in this department, I feel the moral responsibility resting upon us for the many shortcomings in this department. My paper was not intended as a model of literary skill such as the beautiful one of Dr. Hofheinz read before the National Dental Association in the summer of 1899, but a plain, practical, unvarnished statement of facts with the hope that good may come of it.

My paper is not what I originally intended it should be. I have not shown up the possibilities of Prosthetic Dentistry from an esthetic point of view to my liking, but rather the many causes that prevent its development. The possibilities are very great, but we must remove this old prejudice about labor, etc., before we can hope for better things. We cannot be all born Art-mechanics, but we can all help each other by words of encouragement.

If our whole profession had the snap in them that the dentists of Chicago possess, prosthetic dentistry would soon take its first rank of esthetic fine arts.

Before closing I desire to call your attention to a few illustrations which I have tried to prepare with much patience and care, as representing the four basal temperaments in an ideal form While much has been written upon this subject in medical, dental and phrenological works, they have nearly all drifted in the same line of thought from Hippocrates down to the present day, making no effort, so far as I know, to systematize it into useful application. After years of toil to try to grasp something tangible on the subject, I finally decided that to study temperaments intelligently, we must have some nucleus or base to work upon. Setting aside the subject of heredity for the time being, and taking up the study of man as he is, in street cars and all other public places, I concluded to divide him into four parts, and tried to create an ideal head that should represent each one of these four parts. Believing that the so-called bilious and nervous temperaments are but the outgrowth of binary heredity, I classify them as such, and all the basal temperaments after the above mentioned divisions of the body: Lymphatic, representing the glands, adipose tissue, digestive apparatus, etc. Vital, being the heart, lungs and blood vessels carrying the supply. Motor, composed of the bones, ligaments and muscles. And the Mental, which includes the brain, spinal cord and all radial branches.

I ask for this subject, and the illustrations, an honest criticism as it is one which concerns us all. I only know that since I have made them I have been enabled to make some wonderful deductions leading in the right direction, and feel assured that within a year I shall be enabled to grasp the subject and place it within the reach of every one of us for practical use. Therefore, any suggestions will be gratefully appreciated. I am now subdividing the binary by tenths: taking impressions of mouths, color of teeth, by White's shade bar, and making a record of each face and form.

The temperamental conditions found in the human race of the present day, necessarily are the outgrowth of centuries of

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*Copyright by Dr. W. W. Evans, 1903.

ancestral and national heredity, intermarriage and constitutional and mental development. But my study is from an individual standpoint. We are, as we are, now what are we, and what are we capable of, and how can we better ourselves? And what most interests the prosthetic dentist is how can he supply the poor edentulous ones with artificial teeth that will be artistic and perfectly restore the features to a normal condition. The heads representing the different systems are of course ideal, but the sets of teeth are from models now in my possession of mouths, with slight changes to conform to the heads.

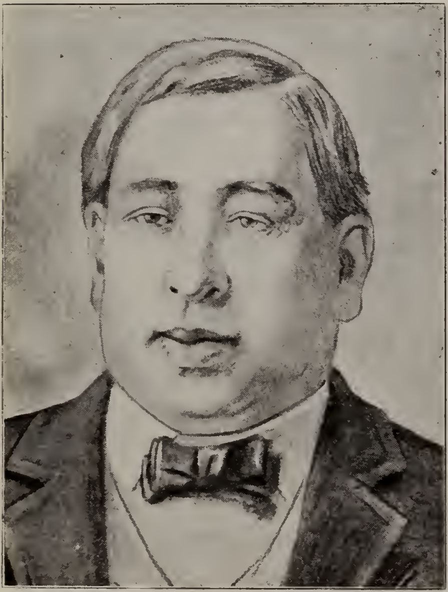


FIG. 1.

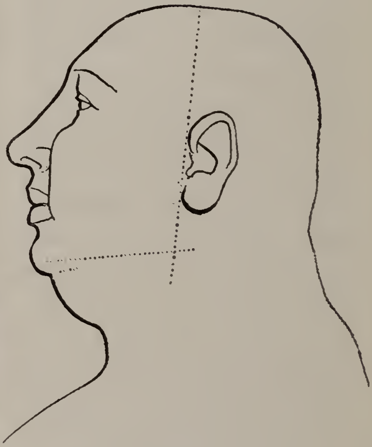


FIG. 2.

If you will grant me a few minutes more, I will try to describe these drawings in order of mental development, commencing with the lowest, so you can grant me a more intelligent criticism.

The Lymphatic temperament is characterized by a predominance in the digestive apparatus, glandular system, and a preponderance of adipose tissue. The external contour has a broadness in excess of roundness of form, with flabby, soft tissues. The circulation is slow and languid.

The Head, as illustrated, Figs. 1 and 2, seems lacking in the intellectual qualities. The forehead is narrow and receding, while the chin and lower portion of face is unusually full and large, with heavy cheeks and a preponderance of adipose tissue around the neck and chin. The mandible is heavy and broad. The complexion is pale with a doughy look about it. The hair is fine and limp of a yellowish color. The eyes of a pale, watery blue or light bluish brown. The mouth is large with heavy lips. The brain of these subjects is slow and feeble, the vital forces are sluggish in functional actions and lack vividness and spirit in mental expression. To eat and to sleep is the height of their ambition.

The Teeth, as shown in Fig. 3, are broad and short, with flat, smooth external surfaces anteriorly. The six upper front teeth are quite thick through, frequently with a prominent inner cusp on the palatal side, with very little interproximal spaces. The overbite is slight, while the angle of the centrals and laterals is about eighty to eighty-seven degrees from cutting edge to apex of roots. The cusps of the bicuspids and molars are broad and flat with very slight sulci markings, the result is, that they do not occlude well and are soon showing the result by mechanical abrasion. The color is of a dull opaque or muddy white or gray. The palatal arch, or dome of the mouth, is flat and broad with more uniform tissue than is found on other parts of the body. The rugae are broad and flat, with but few markings. The teeth are set around the process in a semicircle.

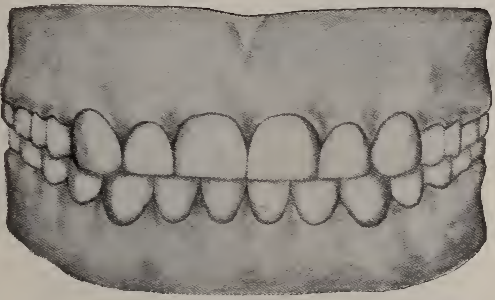


FIG. 3.

The Vital temperament, depends upon the constitutional predominance of the circulatory apparatus employed in the distribution of blood. The heart, lungs, arteries and veins, are indicated externally by a moderately rounded form, that is well proportioned.

The Head, shown in Figs. 4 and 5, is nearly oval in form, especially the face. The forehead, while not large, is full and well balanced. The eyes are blue, large and expressive. Hair is curly, chestnut brown in color. The mouth is well formed, bowed in the corners, with full red lips. The complexion is clear, though ruddy. This temperament has a fondness for outdoor exercises, and a general disposition to active pursuits, though lacking in stability. Happy-go-lucky natures.

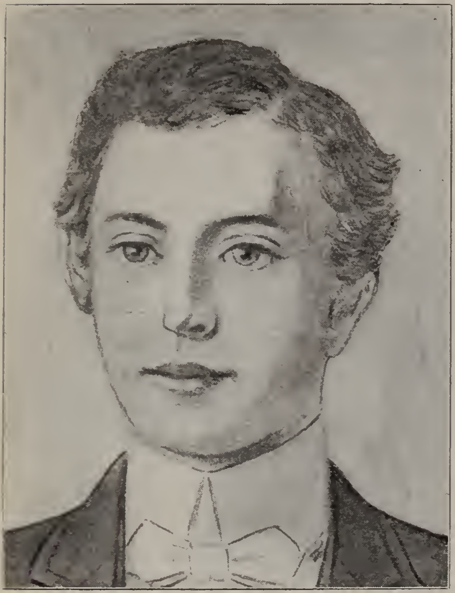


FIG. 4.

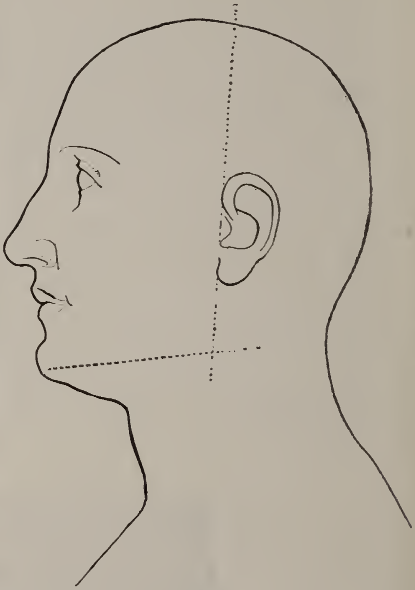


FIG. 5.

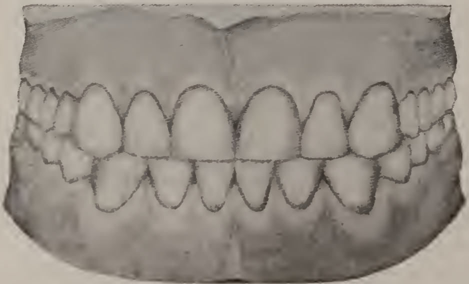


FIG. 6.

The Teeth, as illustrated in Fig. 6, are beautifully formed, with smooth labial surfaces somewhat flattened in centre and rounded contour. They are of medium size to large, a little longer than broad, and are evenly set. Interproximal spaces medium. The centrals and laterals at an angle of about eighty degrees from cutting edge to apex of root. The overbite in front is moderate, little less than an eighth of an inch. The color is light yellow or buff, and very rich in tint. The cusps of bicuspids and molars are well defined and interlocking the sulci firmly in normal occlusion. The palatal arch has the same beautiful oval curve manifest in all other portions of the body. The set of teeth in the alveolar process partakes of the same lines. The rugae are full and rounded, and evenly and liberally distributed over the anterior portion of the palatal arch.

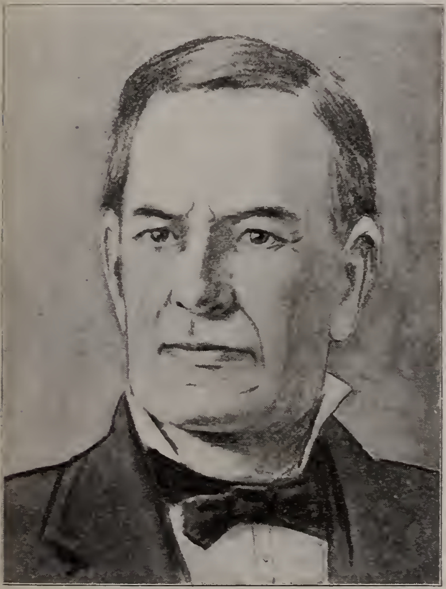


FIG. 7.

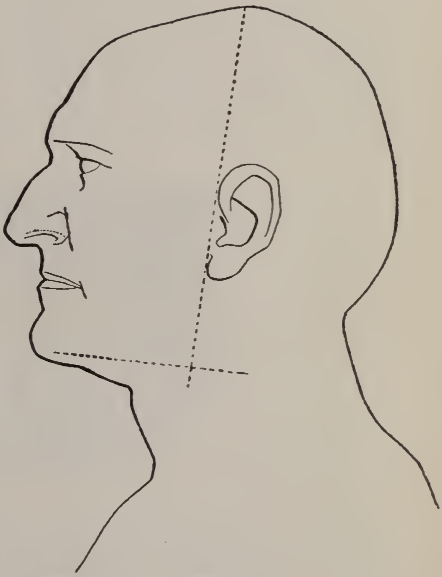


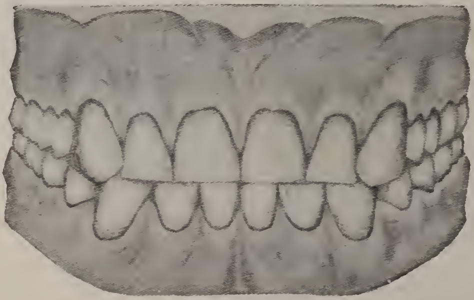
FIG. 8.

The Motor temperament, erroneously called bilious, is one that is particularly striking. The framework is strong and angular. The bones are large with prominent joints. The muscular development is firm and close knit.

The Head, see illustration Figs. 7 and 8, and face are angular and long in proportion to width. The posterior portion of brain and cerebellum are large. The forehead, while prominent and determined, lacks cerebral development. The hair is coarse and abundant and usually black, though sometimes sandy as in the mountain Scotchman. The eyes are dark brown or black, comparatively small and penetrating. The mouth is large, lips medium full. The lower lips projecting slightly beyond the upper with corners of mouth drawn down, with strong lines running from nose through corners of mouth. Chin square and massive. The complexion is ruddy with brownish skin.

This temperament being of the motor or mechanical class, the physical functions are positive action and great energy and power of endurance, with which the brain acts in unison.

The Teeth, Fig. 9, partake of the general characteristics of the face, being angular, with rugged surfaces. The labial and buccal surfaces occasionally have pits and transverse lines over their upper portions near the necks. The interproximal spaces are not large. The color is of a dark yellow, tapering to grayish-brown yellow at cutting edge. The centrals and laterals have a decided tendency to convex curves labially and stand at an angle of about seventy-eight degrees from cutting edge to apex of root with fair overbite. The cuspids are strong and thick, set well out upon the process under the lip at neck, with pronounced convexity, curving downward and slightly inward, giving the square appearance to the front of the mouth. The cusps of the bicuspids and molars are not so pronounced as those of the Sanguineous type, but in normal occlusion are well locked. The arch of the palate is trapezoidal in form, with large irregular rugae scattered over the forward portion, the centre of the palate is usually hard, having but a thin covering of epithelium over the bone, and is sometimes convex in centre.


FIG, 9.

The Mental temperament is the result of mental over physical development. The system is shown in the extreme delicacy and fineness of the form, with small bones and delicate muscles with an abnormal development of brain.

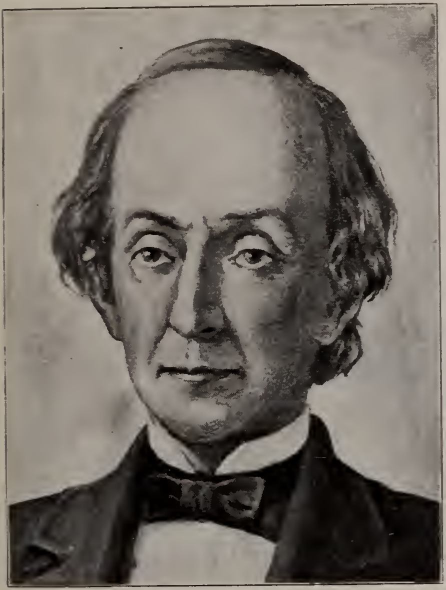


FIG. 10.

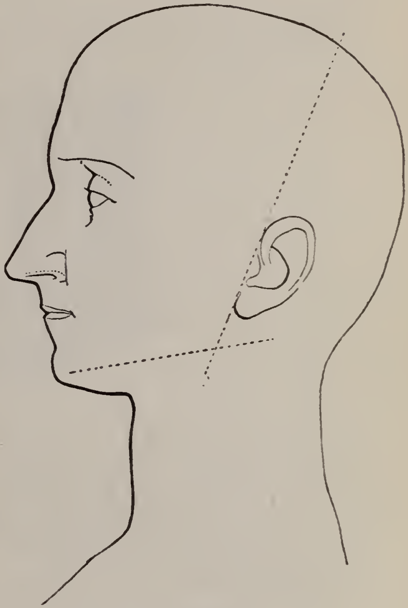


FIG. 11.

The Head, see illustration Figs. 10 and 11, is large and finely developed. The face is thin and delicate, with fine cut features. Forehead broad and coming well forward. Hair is thin, fine and light in color. The eyes are expressive and gentle, of a pale blue or gray. Mouth and lips pale and thin, and rather small and straight across. Complexion pale and delicate, chin small and pointed.

The mental manifestations are in proportion to the physical vivacity. The tendency is to study, to cultivate the desire for the arts and sciences, to live rather in the realms of thought, than to dwell in the common place usages of daily life, especially those of a coarse or sensual character. Their delicate sensibilities make them refined.

The Teeth, Fig. 12, harmonize with the body, possessing the same delicate outlines. The head or crown being larger in proportion to the root or body of tooth, with large interproximal spaces. They are wider at the cutting edge than at the neck which is narrow, with long thin roots. They are delicately rounded, the laterals are smaller and shorter in proportion to other temperaments. The color is of a bluish white or pale gray, the centrals and laterals are translucent at the cutting edge where they are quite thin, the overbite in front is long with a tendency to be shoved forward beyond their normal angle, which is about seventy-eight to eighty degrees. The cuspids, bicuspids and molars have long delicate cusps and deep sulci, which locks closely in normal occlusion. The palatal arch is gothic in form and is covered, in its forward portion, with a delicate network of fine rugae. The curvature of the process partakes of the same lines only on a horizontal plane.

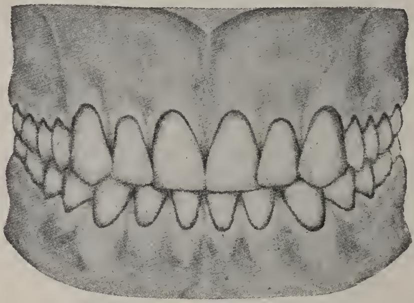


FIG. 12.

This is the foundation upon which we must work; to know how to read the basal temperament thoroughly, is, to know how to pick out, diagnose and classify the binary elements. Like reading a monogram, the predominating feature will stand out and in no part of the body is it more pronounced than the mouth. The external form may be almost obliterated in its characteristics of temperament, but the mouth remains unalterably true in certain lines to diagnose the case.

ADDRESS DELIVERED AT THE COMMENCEMENT EXERCISES OF THE COLORADO COLLEGE OF DENTAL SURGERY, MAY 18, 1903.

By W. T. CHAMBERS, D.D.S.

It is incumbent upon me, as the one presiding, to give greeting to all who have assembled on this occasion:—To my fellow-officers and members of the faculty, to whose faithful labor and painstaking devotion are due so largely the achievements of the year now closing; to the students of the College, who mount to-day another step in the career of professional toil and aspiration; and also to the friends who share, and by their kindly presence double our joy.

An occasion like this is really one for general congratulation. The joy of it belongs not alone to the student of an institution, though it is peculiarly his. As an honest workman he may well be congratulated. He has a right to be glad. There is always joy in good work; pleasure in the memory, as in the fruit, of a faithful toil. To the student, it is a delight to see the long apprenticeship drawing to its close; to anticipate the launching of the craft on which so much of faithful labor has been expended.

But an institution like our own stands for much more than the personal advantage of its students. It represents the welfare of our common humanity. If anybody does not credit this statement, let him consider it when he has a raging toothache. He will then be able to appreciate it. In all seriousness, we have a right to urge on this occasion the broad and vital relation of our chosen calling to human welfare and the progress of the world. We have but to consider the two-fold function of the mouth as related to the nourishment of the body and the art of speech, and it becomes at once evident that the science and art of dentistry are related intimately and nobly to the well being of man; to the beauty of his countenance and the effectiveness of his speech; to his digestion and health and through these to his life and work.

The art of dentistry has shared with other arts the development which marks our age as one of unprecedented progress. Half a century has wrought a marvelous transformation in the operating room. Discovery and invention have brought to our service facilities undreamed of by our predecessors. Take as a single illustration the application of electricity to dental work. As a recent writer has said:

"Electricity has so revolutionized our practical mechanics that much of it requiring great skill and care is now done by its application to every conceivable instrument. In the well equipped dental office to-day, within reach of the hand, a button is pressed and the mouth is flooded with light; another, and the drill is revolved with lightning speed; another, and the mallet is making blows too rapid for the brain cells to count; another, and the lathe is almost noiselessly performing all the operations essential to prosthetic dentistry, with such dexterity that time is quite annihilated."

The spirit of co-operation, another characteristic of our time, has likewise affected the art of dentistry; bringing into combination and partnership for the common good the genius, the skill and the resources of many fertile minds and expert hands. I may refer with pride and congratulation to the latest illustration of this fact in the union of two lately existing and competitive dental institutions in the stronger and more effective College which celebrates this happy marriage to-day in the graduation of its second class.

It becomes us gratefully to recognize our debt to those who have gone before us, the fruit of whose labors we enjoy. We stand upon the high levels which their studious, arduous toil has raised. We can pay our debt only by contributing in our turn some faithful service to the common good. As every man is debtor to the past for its bequeathment, so is he bound to render service in his day, and thus to make bequest to the future. Thus is is that, generation by generation, the work of faithful men in every department of human life contributes to the progress of humanity.

We need to remind ourselves, however, that the greater advantages which we possess as compared with our predecessors must be utilized by our own personal effort if we are to achieve success. No external advantages can compensate the lack of essential qualifications in the workman himself. Never were these qualifications more important than to-day, personal qualities rooted in personal character. Just as in the old days, success is the product of the tool multiplied by the man. No instrument brings skill for its own use. Skill is a personal quality, developed by the assiduous training of nature's gifts. The outfit of a dental establishment includes the man. Energy, industry, unfailing patience, blended with integrity, fidelity and the affability of a kindly heart are indispensable to real and permanent success. "Be a man!" is no mean advice to the student of dentistry.

May I not plead to-day for a nobler thought of the dental art on the part of the great public, and for loftier ideals in the profession as well? It was once the common thought that a dentist was a mere toothpuller. His service lay in the swift relief of pain by the application of mechanical energy. Later on, it was perceived that he had a higher function in the conservation rather than the removal of the teeth. But as we come to see the unity of the entire human body, the close and inevitable relation of all its parts to each other and to health; as we recognize the relations of physical health to the soundness of the mind and its effective working; as we see how essential to the beauty of "the human face divine," to the power of eloquence in the orator, to the balance and the peace of the soul is the health of the whole body,—we discover the true nobility of our art in its ministry to man, to the whole man; to the comfort of his body, the peace of his mind, the soundness of his digestion, the beauty of his countenance, the quality of his speech and to the effectiveness of his work in the world.

Members of the Graduating Class, you are now standing upon the threshold of the vocation you have chosen. Enter undismayed and full of courage. Fix your thoughts upon a high purpose, and a perfect plan. Take unswerving aim. You may not hit the bull's eye of ambition's target, but some shaft from the quiver of your aspirations will at least hit the target. At the forge of dentistry, may you hammer out such renown for yourselves that your names will be recorded in the archives of enduring fame.

Our parting wish is, that your destiny may realize all your ambitions, and a benign Providence speed the consummation of your highest hopes.

OUR FIELD OF LABOR.

PRESIDENT'S ADDRESS.

BY S. S MACFARLANE, D.M.D., FRANKFURT, A. M., GERMANY.

Mr. Chairman and Gentlemen:

In reviewing the dental literature which has been published during the last two years, one is impressed by the growing importance and extent of our field of labor as dentists.

When one reads the voluminous transactions of the International Dental Congress held in Paris in 1900 and the numerous articles contributed to the various dental journals, even of our own country, it must occur to the reader that the term "dentist" and the ordinary titles and degrees conferred upon us, as dentists, are not adequate and are even misleading.

The Century Dictionary gives as the definition of the word

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*Read before the American Dental Society of Europe, Madrid, Spain, April, 1903.

"dentist," "one whose profession it is to clean and extract teeth, repair them when diseased and replace them when necessary by artificial ones; one who practices dental surgery and mechanical dentistry, a dental surgeon."

This is the popular definition of the word "dentist" and the degree of Doctor of Dental Surgery conferred by the great majority of our dental colleges, confirms this definition.

Let us then consider what our field of labor is to-day.

Even if we consider our work as limited to the mouth, we shall find that we must possess many more qualifications than those contained in the definition of the word "dentist," and I would respectfully suggest to our confreres who are giving so much thought and time to the subject of dental hygiene, that one of the first steps in the education of the public mind in regard to our specialty should be to publish an improved or correct definition of the word "dentist."

The human body is often spoken of as a "temple" and also as "the house we live in." This being the case, the mouth is the vestibule, as it is the place of entrance.

There has been just as much change in our status as dentists during the last thirty years as there has been in the vestibules of our houses. In former days, these vestibules were far from being inviting places. They were narrow, without ornament, dark, cold, and badly furnished, serving merely as places of entrance and places of deposit for outer garments, especially those made from products of the rubber tree.

So, formerly, the mouth was a place of small consideration in the human house. It was also often narrow from contracted arches and dark from decayed teeth. It was scantily furnished and the furniture in a bad state of repair. It was also largely a place of deposit and ornaments made from the products of the rubber tree were apt to be more conspicuous than ivories.

At that time, when the dentist was admitted to this vestibule it was very grudgingly, his stay was short and as he was badly, or inadequately paid, he generally retired with some of the remaining ivories.

Now we have reception halls in our houses, which are large and inviting, well furnished and in which ornaments are not lacking.

To-day, when a dentist is invited to enter the vestibule of the human body, he generally finds it a more inviting place than formerly, and, as the owner takes much more pride in its furnishing and preservation, the work required in keeping it in order is not so laborious. Let us then consider what is expected of the modern dentist, under these changed conditions.

We, as members of the American Dental Society of Europe, are obliged to be specialists in all the branches of oral medicine, and as such, are expected to be fully competent to treat every condition that may present itself in the oral cavity.

If we begin, as is undoubtedly the best practice, by cleansing the teeth and then make a thorough examination of the teeth and surrounding tissues, we often find a condition of affairs which is truly disheartening, but of the existence of which the patient is in blissful ignorance. I am not drawing a picture of the ordinary patient who presents himself in a practice in a large city of the United States, but such a one as may frequently fall to the lot of any member of this society in Europe. A number of teeth are sure to be conspicuous by their absence; others are so decayed that the pulp chambers have been invaded and the teeth badly discolored; some crowns have been lost and only their roots remain; while numerous other teeth have cavities of varying size and frequency. The gums have an unhealthy appearance and upon pressure, the exudation of pus indicates the presence of our arch enemy, who has more titles than a continental prince. The presence of erosions on the labial and buccal surfaces of the teeth, together with the presence of our arch enemy, already referred to, suggests a depraved state of system, but whether this depraved state is caused by the condition of the mouth, or the condition of the mouth is caused by constitutional disturbances, has not been made clear by our investigators.

To continue, we often find, fistulous openings through the gums, showing the presence of alveolar abscesses. The tongue in many cases has suffered from the existing conditions, and presents irritated surfaces from broken teeth, enlargements where the teeth are missing, and a rough and furred surface from the action of poisonous excretions from the suppurating surfaces. This description of the pathological conditions which may be, and, as I said before, often are present in the mouth of a patient who has systematically neglected his teeth, does not by any means exhaust the possibilities for trouble.

Through such a contaminated entrance all food and drink must pass, carrying into the stomach pus, particles of decayed dentine, mucus and gases from putrescent pulps. These injurious substances may cause mild septicemia, and undoubtedly do cause many cases of dyspepsia. The air that is breathed passes, partially, and often almost entirely through the mouth, and in cases of sudden or vigorous inspiration may carry some of the poisonous matter into the air passages and cause inflammation of these passages and even of the lungs. When we consider that the majority of all infectious diseases, such as diphtheria, tuberculosis, pneumonia, cholera and typhus pass into the system through the mouth, we are impressed by the fact that all forms of bacteria would find nourishment in such depraved secretions.

The natural occlusion has been destroyed in such a mouth by the loss of teeth in both arches, and the power of mastication is much reduced. This fact, added to swollen and painful gums, causes the patient to swallow his food with very little effort at mastication. It is almost the exception when the dental arches, especially of the younger generation, are of normal size and normal in their relations to each other. The superior arch is frequently contracted and abnormally small, causing a narrowing of the nasal passages which results in mouth breathing, or else in insufficient supply of air to the lungs and imperfect oxygenation of the blood.

I have directed attention to these various conditions which we are called upon to treat, to emphasize the fact that it is not enough for us to be dental surgeons. We must be equipped as doctors of oral medicine as well.

In reviewing the subjects to be discussed by the members of the section of odontology, I have been especially impressed by the importance of preventive treatment of the mouth and teeth. We are taught that the first step in the treatment of disease is the removal of the cause. Is it then possible to remove the cause of dental caries and the various diseases of the mouth? In the January number of the *Dental Cosmos* Professor Miller says, "In the normal intravascular blood of every human being and animal there are substances called alexins which to a certain degree afford protection against the invasion of pathogenic micro-organisms. This protection, which is of a general nature, appears in the one case exceedingly feeble and easily overcome while in other cases, particularly against certain kinds of bacteria, it is sufficiently powerful to guarantee absolute immunity under normal conditions."

Dr. Lahmann, a German physician, goes farther and claims that by the employment of a diet which will supply, in accurate proportions and accurate quantities the exact elements necessary to form normal blood, we can become absolutely immune from disease.

If, then, it is possible to place the mouth in such a condition that the enamel of the teeth shall be able to resist the action of micro-organisms, we should earnestly strive to accomplish this glorious result. There have arisen prophets in our midst who predict that the glad day is not far distant when we shall be able to preserve our patients' teeth by preventive treatment. But, as it is quite a common occurrence for the permanent molars to make their appearance in the mouth with their enamel in such an imperfectly formed condition, that it is necessary to fill these teeth before they are fully erupted, I am afraid we must wait for the day when the selection of a perfect diet will produce that normal condition of the blood which will resist all diseases, before we shall have entire immunity from decay. This subject of preventive dentistry, although it has attracted our attention, has not yet irritated our consciences.

It is an indisputable fact, that much more can be done in the way of preventive dentistry than is now being done by the profession at large, and no consideration should be allowed to stand in the way of our adopting a course of treatment which would add to the comfort and well being of our patients. The plea raised against this form of treatment by some dentists, that it would result in lessening the demand for our services, reminds one of the fears of others, who some years ago claimed that the discovery of an insoluble cement would do away with the usefulness of a great many dentists. Aside from the fact that the insoluble cement has not yet been discovered, this selfish view of our relation to our patients is certainly unworthy of us. In any case, those who have employed this preventive form of treatment, have not noticed any diminution of practice.

Let us then exert all our energies to prepare ourselves for the responsible position which we occupy as dental surgeons and doctors of oral medicine and, after we have given our patients the benefit of our best skill in restoring the dental arches and the teeth to their normal conditions and beauty and exerted our utmost endeavors to heal all the membranes of the mouth; let us teach them of the necessity of, and give minute directions for prophylactic treatment and insist upon an early return for examination and further preventive treatment.

Professor Andrews of Edinburgh entered his classroom one morning before his students had assembled and wrote on the blackboard the following announcement:

"Professor Andrews begs to announce to his students that he has been appointed physician to the Queen."

When the first student arrived in the class room, he promptly wrote under the announcement, "God save the Queen!"

Let us then write under the record of each day's work, "God save our patients."

STUDIES ON THE EXPANSION OF PLASTER OF PARIS, AND ITS BEARING ON THE USE OF THIS MATERIAL FOR IMPRESSIONS AND MODELS.*

By J. H. Prothero, D.D.S., Chicago, Ill.

Plaster of Paris is the most commonly used, and by many is considered the most reliable material for taking impressions of the mouth. Like all other mediums used for this purpose, it has its advantages and disadvantages, but in most respects its value is unquestioned.

Its elasticity when freshly mixed, its tastelessness and freedom from odor, the facility with which the most irregular surfaces can be copied, the rapidity with which it sets, and the fact that it can be introduced in the mouth at ordinary temperatures, recommend it for general use.

Being inelastic and brittle, it breaks with a clean fracture, and the broken pieces can easily be placed together again, so that the impression of any surface or deep undercut may be secured with accuracy.

The principal disadvantage in the use of plaster of Paris for impressions and models, is its tendency to expand, during and after setting.

For many years close observers have noted this expansive property in plaster of Paris, and some, recognizing its importance in denture construction, have endeavored to find some means of controlling this movement.

Among the first of those who considered this subject worthy of careful consideration was Dr. T. L. Buckingham, who in 1860, after a series of careful experiments, contributed two articles in the *Dental Cosmos* of that year, one on the expansion of plaster of Paris, the other on the force of expansion of plaster of Paris.

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*Read before the Chicago Dental Society, March, 1903.

In order that his experiments might be accurately conducted, he constructed a micrometer, registering the 2240th of an inch, and an apparatus for weighing the force of expansion, both of which are illustrated in the articles mentioned. In his paper on expansion, after finding that the expansion of an ordinary model, from the buccal surface of one tuberosity to the corresponding surface of the opposite side was about the 140 or .0071 of an inch, he concludes his article with this remark, "Surely this amount of expansion could not have much effect on the fitting of the plate."

Dr. Buckingham evidently changed his views on this point, for after making a series of tests on the force of expansion and finding that this force amounted to 30 pounds per square inch, he concludes the second article as follows: "We see by these experiments that the force of expansion would be sufficient to warp the strongest plate out of shape; whether it would do so or not to plates made for shallow mouths, I must let every operator judge for himself; but certainly in cases where the plate is so deep as to confine the plaster, the plate would be bent."

The author of these papers offered no suggestions as to how expansion could be controlled or compensated for.

Six years later, Dr. John C. Crooks called attention to the warpage often resulting from expansion. He suggested two methods for overcoming this almost constant source of error: first, taking an impression in wax, and after trimming properly, using this as a tray for holding the plaster for the regular impression. By this method the plaster impression consists of only a thin film of expansive material in which but little movement will occur. The second method recommended was to remove the tray and impression from the model as quickly as possible after pouring the latter.

The same year (1866), Dr. T. D. Chamberlin also wrote an article in which he attributed the failure to secure proper adhesion of completed dentures when introduced in the mouth, to the expansion and warpage of plaster of Paris in the preliminary stages of construction.

After experimenting with various substances which might be added to plaster of Paris, to overcome its expansive properties, he finally concluded that sulphate of potassium would accomplish this, partially at least, and accelerate the setting as well.

In 1880, Dr. W. Bowman McLeod, of Edinburgh, presented a paper to the Odonto-Chirurgical Society, in which attention is called to both expansion and warpage of dental plaster. He recommends the addition of potash alum to the water with which the plaster is mixed, in the proportion of four ounces of the former to one gallon of the latter. He claimed that plaster mixed with the solution recommended would lie absolutely flat and neither expand or warp, as would occur when mixed with water alone.

In 1882, Dr. Geo. A. Fowler stated in the *Cosmos*: "As plaster is generally used, the casts made from it expand and sometimes warp, causing great inconvenience. This, however, can be entirely overcome and actual shrinkage of the cast secured by the careful selection and proper manipulation of the plaster." He recommends the use of warm water with a little salt, the mixture thin, and the mass stirred thoroughly.

In a later number of the *Cosmos* of the same year is an article by Dr. Stewart J. Spence, in which he describes a number of experiments with plaster, with the object of discovering some means of obtaining the greatest hardness with the least expansion. The results of these experiments were stated by him as follows: "Thus it was found that by mixing plaster of medium consistence and pouring immediately the casts made thereby set harder, expanded less, and the expansion set in much slower than by any other mode of mixing, the only drawback being that it set more slowly."

Several articles by the same writer appeared in the "*Items of Interest*" of last year, on this subject, in one of which he states that he has discovered means for preventing expansion in plaster, but since he has not yet given it to the profession, we are still without means of perfectly controlling this movement.

From the sparseness of literature on this subject, as compared with that on other prosthetic topics, it would appear that the dental profession had failed to recognize, or at least regard this important physical property of plaster of Paris with more than passing curiosity. It is with the desire of stimulating a greater interest in the subject under consideration than has been shown in the past, that this paper is presented here tonight.

For the sake of inviting discussion, and because I firmly believe it to be a fact, I will venture the assertion that a larger proportion of ill-fitting dentures may be traced to the expansion of plaster of Paris than to any one other cause.

Let us see in what manner the expansion and warpage of impressions and models affect the adhesion of dentures.

The old experiment to which Dr. McLeod called attention was carried out with the same result: this consisted in mixing and pouring plaster on a flat slab, the margins being confined by bars cemented to the edges of the plate. In 24 hours the slab of plaster had bowed up in the center to a very noticeable extent while contact was perfect at the margins of the plate. This shows what will occur when an impression is allowed to remain in the tray for a considerable length of time. The sides of the tray act in the same manner as the cemented bars, offering resistance to lateral expansion, and since expansion occurs the movement is in direction of least resistance, and the depth of the palatine arch is consequently increased. If a model is poured into the impression, and the tray and impression are not removed quickly, a similar error occurs as in the first instance, viz.: the sides of the impression supported by the tray prevent lateral expansion and the depth of the palatine portion of the model is increased. Thus two errors have occurred, either one of which might, and both together certainly would seriously interfere with the adhesive properties or induce a rocking in a denture molded over such a model.

In order to overcome this difficulty, I have for a number of years advocated the method recommended by Dr. Crooks of trimming the impression and pouring the model immediately upon removal of the impression from the mouth. Then as soon as the plaster constituting the model would permit of handling, take away both tray and impression from the model.

This, as I thought, prevented warpage, but did not control expansion. The expansion was compensated for by slightly scraping the peripheral margins of the model on the labial, buccal, and palatine surfaces where the margins of the denture would terminate.

So far, the experiments with the micrometer show that expansion sets in so rapidly and progresses so far in such a short time that in most cases it would be impossible to secure a model in which warpage had not occurred to a greater or less extent.

An impression tray might be constructed with a skeleton rim for the outer side of the tray, which would support a strip of thin rubber or cardboard for holding the plaster impression material in place. Such a tray would permit lateral expansion to occur and would, I believe, prevent warpage in the impression.

Recognizing the importance of expansion and warpage on denture construction, and with the hope of finding some better means of controlling it than is now known, I have constructed a micrometer for accurately studying the movement as it occurs, and of noting the effect the addition of various substances may have when added to the plaster or water or when different methods of manipulation are employed.

The dial of the micrometer is graduated to read to the one ten thousandth of an inch, and the one five hundredth of a millimeter. The point of the index hand covers about one-fourth of a one ten thousandth graduation, so that readings can readily be made to the forty thousandths of an inch, or the one thousandths of a millimeter. A triangular receptacle or trough for holding the material to be measured is firmly clamped to the brackets on the base of the instrument. Material ranging from a thin film to six inches in length can be accommodated between the ends of the trough, one of which is movable, and the other permanently fixed. The movable end advances or recedes with the material according to whether expansion or contraction is taking place. A steel rod, connecting with the mechanism of the instrument, rests against the movable plate, and as movement occurs, the hand on the dial indicates the amount of movement.

Owing to the short time that has elapsed since the instrument was completed, I have been unable to make very many tests. In those which were made, the plaster of Paris was manipulated as it ordinarily is in impression taking. Plaster of Paris was procured from four different supply houses and a number of tests made from each can. Some variations as to time and amount of expansion were noticeable. The difference, however, was not radical, and might be accounted for by difference in mixing.

Twelve attempts were made to secure identical results from the same can of material, the temperature of the room, the water, and the plaster being approximately the same in each case, the mass stirred in a similar manner and the same length of time. The results, all different, indicated much variation as to time of beginning, rapidity of movement, and amount of expansion.

Solutions were made in varying proportions, with chloride of sodium, sulphate of potassium, and potassium alum, and mixes of plaster tested.

A saturated solution of water and potassium alum was used for one experiment, and this showed the minimum amount of expansion with this material (.0007). In mixing, the mass was foamy and full of air bubbles and of imperfect density when set. It also set too rapidly for impression work.

Another mix containing one-fourth as much alum was made and manipulated in the same manner; this showed 85 points expansion in 20 minutes, after which no more movement was observable.

The addition of salt seemed to control expansion to a limited extent, but it does not exert as much influence in this respect as potassium sulphate.

The twelve mixes mentioned were made as follows (3 ounces of plaster were added to 2 ounces of water containing 16 grains sulphate of potassium):

No. 1	1 Point	15 Minutes
No. 2	1 Point	15 Minutes
No. 3	32 Points	15 Minutes
No. 4	8 Points	15 Minutes
No. 5	42 Points	15 Minutes
No. 6	40 Points	15 Minutes
No. 7	22 Points	15 Minutes
No. 8	56 Points	15 Minutes
No. 9	49 Points	15 Minutes
No. 10	58 Points	15 Minutes
No. 11	127 Points	15 Minutes
No. 12	44 Points	15 Minutes

The effect of long stirring is shown in the following:

Plaster stirred 3-4 minute expanded.

Min.	Points.
10	2
Stirred 1 min.	
10	32
Stirred 1 1-4 min.	
10	61
Stirred 1 1-2 min.	
10	93
Stirred 2 min.	
10	118

This, together with observations made on other experiments, leads me to believe that plaster is far more sensitive to stirring than has been suspected by the ordinary observer.

So far as my observations go, the statement made by Dr. Spence, that "long stirring of plaster of paris hastens setting and increases heat and expansion" (*"Items,"* Oct., '02), is correct.

His proposition that there are two expansions occurring, I believe, is incorrect. Quoting from his article above noted he says: "The primary expansion proceeds only during the period in which the heat of the crystallizing cast is rising. Thus it is complete in from five to thirty minutes." Speaking of his measuring appliance, he continues: "They showed that there occurs a second expansion, proceeding for about twenty-four hours and amounting to one-fourth or one-fifth that of the first expansion."

In the experiments so far carried on the expansion began quickly with the rise in temperature, increased rapidly for a few minutes, then diminished, rapidly at first, then more slowly, until all movement ceased. There was no distinct division between the rapid and slow expansion, but a gradual lowering of the rate as shown by the experiments made to date.

I hope in the near future to be able to present in a more concise and tabulated form the results of these experiments.

There is still much to learn in regard to this peculiar physical property of plaster of Paris, and it is to be hoped that all interested in using this material will assist in solving a problem which has so important a bearing on denture construction.

A METHOD OF USING THE LOGAN & DAVIS CROWNS.*

By L. O. Green, D.D.S., Chicago, Ill.

This society is deserving of better treatment than I can give at this time. When I was asked by the program committee to prepare a paper for this evening, I accepted without realizing the short time in which I had to do it. In addition to this, the work I had to do on committees for the 15th anniversary of the Odontographic Society, precluded the possibility of my doing anything until that meeting was over.

There are a few old thoughts which I wish to bring before you for discussion, because they are so valuable they will bear a rediscussion. I think we, as dentists, are too apt to pass over our old ideas and methods of operating for some new hobby. I have been in the profession long enough to have seen a return to our old ideas in many things with the firm conviction that they far overshadow in virtue and utility the newer ones. To my mind what is needed at the present time in the dental profession is diagnostic training to enable us to properly select and adapt the best kind of operation for a given case, taking into consideration all the conditions. We must remember always that no two cases that come into our hands are exactly parallel; therefore, it is not as a hobbyist that I present for your consideration tonight the banded Logan and Davis crowns, but because I believe they merit our careful consideration.

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*Read before the Chicago Dental Society, March, 1903.

First, Logan crown with platinum cope united and porcelain union. Second, plain Logan crown. Third, a Davis crown with platinum cope and porcelain union. I wish it understood that I use these crowns only when I consider the surrounding conditions indicate their choice—for there is no crown that is universal in application. The Logan crown with platinum cope can be used on any of the teeth where porcelain is indicated and a band advisable. The root should be prepared as for any porcelain banded crown, with the exception that I use "safesided" root facers and cut the root far enough under the gingivae to allow the cope to be entirely buried when crown is in position.

And right here, I wish to enter a protest against wide bands. I do not believe they are ever necessary, and almost always injure the peridental membrane. After the cope has been properly fitted, remove it, then select a Logan crown most nearly adapted to the case, as to color and size. Grind and adapt to position in the mouth. Next bevel the lingual root margin of the crown, cutting away quite liberally that we may have plenty of room in which to see and pack the porcelain. Now return the cope to position and with a sharp instrument make an incision opposite the enlarged root canal; this incision must be small enough to grasp the pin when the crown is forced into position. The object is that it may bind upon the pin and come away when removed from the root without displacement.

At this point, if we have been careful with our work we will find that the cope and crown are held together rigidly, and can be removed and soldered without investing, with every assurance of being just right when completed. If, however, on introducing the pin through the incision in the cope there is a tendency to wabble, remove the crown, dry the cope, and put a little hard sticky wax around the base of the pin, warm, and force to place. Flow cold water over the crown with syringe, after which it can be successfully removed. In this case invest and solder.

I prefer 25 per cent platinum solder, although pure gold can be used. After cooling, remove, thoroughly brush and cleanse. This is all important. Now we have a crown, the pin of which can be grasped in a pin vice. Pack with porcelain body in this V-shaped place until nearly full, and biscuit. At the next baking, build the proper contour, allowing for shrinkage, and again bake. Two bakings, as a rule, are sufficient. The crown is now tried into position and examined as to contour, contact points, and occlusion. If any slight grinding is required it may be done, after which it is placed in the furnace and glazed. This gives us a completed crown, beautiful as to appearance and adaptability, simple of construction, harmonious in color throughout, showing no lines where porcelain has been added, and withal the strongest porcelain crown made.

I submit to you the statement that it is not possible for us to bake porcelain that will be as good in color, or as strong as that baked by good tooth manufacturers.

The banded Davis crown is made exactly as the preceding, up to the completed cope, into which a pin is introduced which has previously been adapted to the root canal and long enough to extend about 1-16 of an inch occlusally beyond the cope. The crown has been previously ground and adapted to the root without the cope in position. The cope is then replaced, and the pin introduced and bent or otherwise changed so when the crown is adjusted, the pin will fit into it fairly accurately. The pin and cope are then removed and united with 25 per cent platinum solder.

At this point the canal of the crown is extended through to the occlusal surface in case of molars and bicuspids, or to the lingual surface of incisors or cuspids. All parts are again adjusted to the root. It is important to have the crown set down flat upon the coping, when, if the pin fits accurately in the crown canal it will stay in position if held upright. Then the body and the enamel can be packed through the opening made in the occlusal or lingual surface. Two bakings are all that is necessary. In case further grinding is necessary, it can be reglazed. The advantages this crown presents over the former are: 1st. That we do not have to solder over invested porcelain, and, consequently, there is less liability of checking. 2nd. That more natural shades can be obtained in the Davis crown than any other.

When properly handled, the plain Logan crown is entitled to far more consideration than is usually given it. When surrounding conditions will permit the use of this crown, I fully believe it is of value, providing, of course, it is properly adjusted.

What would many of the practitioners of small country towns do if it were not for the Logans? And how often do we see such crowns that were set by these practitioners, and worn many years with perfect satisfaction, doing good service and in perfect condition? On the other hand, had the ferrule crown been employed, I dare say we would find the condition appalling—hypertrophied gum, loose root, and perhaps the root injured beyond redemption.

I am of the opinion that about as many roots are rendered useless and ultimately lost by ill-fitting bands, as are saved. In other words, many roots are banded to death. There are conditions where the gingivae hugs the root so closely that it is impossible to tent it away sufficiently to prepare the root. If the adjacent teeth are intact and the other conditions favorable, I believe this to be one of the good places for a plain Logan. In grinding a Logan crown to position, I place a carbon paper disk to fit over the pin and down on the neck of the crown where it comes in contact with the end of the root. When the crown is forced into it we will find wherever the crown strikes the root first it will leave a black line. Remove the carbon disk and grind crown wherever we find the black mark. Repeat the operation until the line is continuous at the periphery of the crown. If we have ground carefully, we have a perfect joint.

When the conditions are such that a band is required for strength, but not possible of adaptation, I believe in a 1-2 band or a lingual lug, which answers all the requirements, and is not so irritating.

OUR PROFESSIONAL FUTURE.*

DR. C. A VAN DUZEE, D.D.S., ST. PAUL, MINN.

I was asked some time ago what I would do for the State association, and I said I would do what you wanted me to, and then you asked me to write on this subject, and it was with anxious fear and dread that I approached it, for I can assure you that the future of the dental profession is of sufficient magnitude to occupy a great deal more time and thought than it is possible to give it in the short paper to be read at this time. All my life, as a professional man, I have noticed that one of the things we need in the dental profession is to get closer together. I think we need a larger supply of the milk of human kindness. I think we want to develop the best that is in us, and I felt a misgiving as the time approached for the reading of this paper that you might misunderstand me a little on that point. I believe we have some of the most progressive men that come here to do the work that are realizing individually the great magnitude of the subject treated in this paper. I presume this paper will probably not reach the men it is intended to reach, but I will give it to you for what it is worth.

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*Read before the Minnesota State Dental Association, St. Paul.

Every thinking man governs himself largely with reference to the future. Some carry the habit to an extreme, but many give it little consideration. In order that we may grasp those things which are essential to a proper understanding of the subject, we must examine ourselves carefully, our environment, those things which hinder us and those which may help us, and the fact must not be lost sight of that this profession of ours is not going to stand still and wait for us very long. There are influences at work that are beyond our control. The people at large are not standing still; the children of to-day are not the children of yesterday, and there is the handwriting on the wall for those of us who have eyes to see. Let us consider a few of the many conditions that surround the problem.

The question of ethics in dentistry has little, if anything, to do with the "Code of Ethics" as promulgated for many years, and this same "Code of Ethics" has, in my opinion, been one of the greatest stumbling blocks in the way of the establishment of a true ethical atmosphere in our professional circle.

When a youth receives his education, whether it be obtained in the best colleges, in the business world, or among the cattle upon the farm, the result is apt to be a creature of circumstances and environment, with a conception of right and wrong, more or less colored by the associations of the daily life of the individual. The influences of the parents, the school fellows, and the business acquaintances, together with the hereditary temperament and an infinite number of other things, all combine to produce a man of a certain worth or value from a social standpoint. One inherits a combination of vicious traits of character, another refinement and virtue of a high order; the first through an inherent tendency to progress overcomes in some degree the handicap of birth; the second, through weakness of character, descends to a level with his surroundings. The world is composed of an endless variety of men who range from one extreme to the other. The one who rises above his normal level, even if he does not attain to the ultimate plane of the one who falls below his natural position, deserves more or less credit for his accomplishments; and again, the one who falls below deserves more or less of censure.

The people at large are the judge, self-constituted, perhaps, before whom each man must stand. In a consideration of this question from a dental point of view, one is apt to forget all these things, and to weigh and classify men by comparison according to a certain standard. Our friend across the way never graduated from a reputable school; his normal condition is bad; he does not do good work, at least we have seen some that was not up to the mark. His fees are below the line, and he does not grace the profession to which he has obtained admission. Let us go back along his trail. In youth he was the mainstay of his parents in an humble walk of life, and until many of the best years of his life had passed, the spark of ambition which glowed within his soul was all but smothered; at last the chance comes to him to knock at the door of his chosen calling. The knock is feeble, perhaps from lack of many things which to others were not denied. He enters and assumes a place. Go into his home life to-day; perhaps you will find a wife who came with him out of the past. There may be children born of this union and dependent upon this man; you may find them studious and affectionate, and yet they are not well dressed or polished, but as compared with those other children who lived in the past, they are positive evidence of progress in every way. Who shall say that this man is not entitled to be received upon an equal footing with him, who, while adding grace to the professional calling which has become his through the very fact that by birth, environment, and fortunate circumstances, is the better fitted to demand admission, even though the present status of this second man is below that to which, by every right, he was originally entitled?

We are apt to judge our fellows superficially. We see them from a certain point of observation, and above all, we see them with eyes that are our own.

A man makes an appointment with a child lacking in everything that goes to make a good patient, and puts his very life into the operation and the attempt to educate that child lor future operations. The results are not beautiful to look upon, nor are they of much value to the tooth. The operator leaves the chair sick at heart, discouraged, and physically worn. You, my friends, may see this case next fall. As you look upon this faulty piece of work, and maybe the only one you will ever see from the man across the way, will you be able to put yourself exactly at the right point of observation to see this picture as a whole, or will you see the failure through glasses that are colored? Will you say to the child or its mother, and perhaps her friends, that the work is a failure and must all be done over? Will you take this child, now older and perhaps improved as a patient by the lessons so patiently taught by the man across the way, and perhaps in many ways better able to meet you half way, to the end that a better operation may result? Will you steal the life-blood of your neighbor and use it without credit to him? Will you classify him by the result of this operation, by the clothes he wears, or the style of sign he displays upon his office window? A dentist once placed a cotton dressing in a tooth and sealed it with cement under circumstances which demanded exactly that treatment, and was called away from the city. The man who was called upon to finish that case, and it had been neglected for months, removed the cement, found the cotton in the pulp canal, and before several people who happened to be in his office, criticised his brother severely. Another dentist received a patient from another city, and observing a crown which had been worn through by a sharp occluding cusp, although only a year old, remarked to his patient that he must reset that crown. He took it off, made a new one, and placed it in position without charge and without comment to the patient, and when pressed by another for an explanation, said: "Dr. So and So is a good man and deserves a good turn." I know these men well; the first a graduate of the best schools, of good family, and having every opportunity for the development of the most that he was capable of; the other man, of no family, of humble birth, and the only education he ever had was picked up as best it could be obtained, and he practices dentistry to-day without a degree.

I have been much interested in an article by Dr. F. R. Adams of Vernon, N. Y., upon Dental Ethics, published in the Cosmos, for August, 1901, and I venture to quote the last paragraph of this delightful essay.

The Doctor says: "Thus endeth the Code of Ethics. Now what does it all amount to? The greatest ethical law ever written, the one which includes all the teachings of the code, and in fact, of all ethical law, is 'Do unto others as you would that others should do unto you.' If we will only keep this maxim before us and try to live up to the best that is in us, we will not need any Code of Ethics. 'Honesty is the best policy,' and while the dishonest man may seem to flourish to-day, yet the man who conducts his practice in a straightforward, honest manner, will prosper, and he will have, besides, that greatest of all blessings, a clean conscience. This above all, 'To thine own self be true, and it must follow as the night the day, thou canst not then be false to any man.'"

The next line of the page informs us that there was no discussion of this paper. Men write upon everything and anything, and there are many to discuss the subjects, but when a man has the courage to write upon a subject that has more to do with the future of the dental profession than any other thing, there is no discussion.

I want to say a word on the question of advertising, more especially for the young men who perhaps are but just beginning the building of a professional career. What have you to advertise? Do you wish to attract to your place of business people who want something for nothing? Do you wish to attempt to create in the minds of your prospective patients, the idea that you are more skillful than your neighbor? Do you wish to place your services at their disposal, at prices which, of themselves will attract, or do you wish to develop a legitimate circle of patrons? It lies with you, and in exactly the manner of your greeting to the public will your future life develop. There is but one legitimate method of advertising, and that is, that you are a dentist, that your office is in a certain location, and that you are there for practice between certain hours, unless you wish to attract an undesirable class of patrons. Someone must care for the poor, the ignorant, and the selfish, and it is the duty of every professional man to give freely of his time to the poor, and he must regulate his fees up and down the line to meet the requirements of his practice. That does not mean that he should rest there.

The struggling young person of to-day, if treated honestly, may be educated into the most desirable kind of a patient for the future, and one of the greatest pleasures of our lives is in contemplating the results of our work as years go by, and the youth of yesterday becomes the sinew of to-day's business and social world, provided the operations were well done and the youth well educated along the lines that fall to us as members of a young and little known profession.

There is another question that is very closely related to my subject: What shall we do to counteract the influences of our friends who are neither honest nor ethical? There are three ways in which we may legitimately attack the men who are without the pale of professional life in dentistry. We may set them an example which will demand respect. We may stop throwing mud at them, and do a little true missionary work by inviting them to be one of us, and we may provide clinics in which the poor, the ignorant, and the selfish may be properly treated, at prices within their means. What large city has not its free dispensary and its hospital for those who are unfortunate? What large city has an infirmary or hospital for dental work, unless there be a department of some college of dentistry to take its place? We owe it to our profession to see that these things are accomplished, and yet, how little is being done. We have not the time, the brains, the business ability, or the courage to go out and do what every dentist in this society knows would do more to further the best interests of dentistry and humanity than tons of paper and barrels of ink will ever do.

Our brothers in medicine and law know these things, and are doing much to organize and support such enterprises. How long are we going to trust to luck to help us to this work that is crying out for help? In this city we have physicians and surgeons and hospitals, supported in whole or in part by the government, to care for the unfortunate. How many quacks will such things deprive of their victims? There are men who are paid to spend their whole time in the courts and the highways in looking after the criminal or unfortunate classes. How many shyster lawyers are deprived of their victims through these methods?

If there was a public infirmary in this city for charitable or semi-charitable patients who require dental services, how many quack dentists would be deprived of the excuse for their existence? There is another duty which demands more consideration. Dentistry encroaches and follows closely upon the practice of medicine, and the physician and surgeon are worthy of cultivation. To the ethical man they are ever willing to extend courtesy and brotherly advice. We need a closer relationship, and the accomplishment of that requires two things. First, we must know our own professional business well enough to command their respect; and, secondly, we must go to them in consultation. The science of medicine and surgery is old enough to make it our duty to take the initiative, and the results of a more intimate acquaintance can not but further the best interests of dentistry, and in addition the benefits to the public must of necessity be very large.

These things all bear a close relationship to the subject of this paper. The ethical man in any profession lives in an ethical atmosphere, the possibilities for which must depend largely upon the standing of the whole. A few men of worth, character, and ability, cannot elevate the whole profession to that point where it should be to-day, and as time passes, the future will demand more of us. The field is broadening, the requirements are becoming more exacting, the public is becoming educated, and upon every hand the dentist is brought face to face with a more difficult problem year after year. "What will it profit a man if he gain the whole world and lose his soul?" can be readily applied to the question before us, with but the change of a few words.

It is easy to find fault and to waste our time in passing remarks, but the solution of the complex problem before us requires action and the self-sacrifice and energy of the pioneer along any line. Dentistry is in its infancy, the standing of the profession is as yet not clearly defined, and it lies with us to make our impression upon its future. When the time comes for us to lay down the burden of practice, shall we be able to look back with pride upon the results of our life work, or must we throw aside the profession with the same feeling that a worn-out implement is discarded? The successful leader of men first inspires his followers with pride in the cause which they are to battle for. Men do not throw themselves into the fight with enthusiasm and persistence unless there be inspiration. Great victories are never won without both, and then not without leadership and organization. It is a pleasure to compare the dental current literature of to-day with that of a few years ago, and it is clearly in evidence that the material with which this grand work is to go on is abundant. The field is ready for the harvest, and the laborer is waiting for the directing power. We need to-day leaders, organizers, and ministers who are capable of laying out the work, and of directing its accomplishment, and in these men we need the best. In any crisis there is seldom lack of such material, and the thing most needed to-day in dentistry is the recognition of the fact that a crisis is on.

The matters which occupy the time of this society at its annual meetings are exactly those things which should be observed, compared, and reflected upon, and yet, what proportion of the profession of Minnesota are here to-day? It is true that in every similar work the burden of progress rests upon the shoulders of the few, and yet, I believe that we have each one of us overlooked a duty in the past few weeks. How many of us have gone over into the office of the man across the way and invited him to come here? How many have extended the hand of fellowship to the young men who have this year started upon the pathway of professional life? How many of us greet our brother dentists with a smile of welcome when we meet them, or go out of our way to extend to them a courtesy? What leader of progress could hope to unite the soldiers of a cause in any other way. We have men of brains, energy and courage among us. They are not all of a size, of similar color, or of just the belief, perhaps, that appears most desirable to us. Shall we thrust them aside on this account and strive to fight this battle without them, or shall we join with them, broadening our ideas sufficiently to profit by their good qualities, and to overlook their short-comings? Shall we criticise them, or shall we encourage them?

The future of our profession demands something of self-sacrifice on our part, not alone in the work we must do ourselves, but in that we must recognize the worth of our brothers and cultivate the best that is in them. If we are to give a long, strong pull together, the energy must be harmonious, and with every effort upon the part of the individual to bring himself into closer harmony with his fellows and the conditions as they exist to-day. with every endeavor to help the good work along, the individual receives personal benefit not only in the greater comfort and happiness of the present, but in that sense of satisfaction which will surely be ours when the time shall come for each one of us to lay down our work and become a spectator of the progress which our chosen profession must surely accomplish.

THE SYSTEMATIC ARRANGEMENT OF LECTURES ON OPERATIVE DENTISTRY.*

By C. N. Johnson, L.D.S., D.D.S., Chicago, Ill.

In presenting any subject to a class of students in the lecture room it is necessary, if the best results are to be obtained, to so arrange the headings that the order of presentation shall carry the subject in a regular sequence from the fundamentals to the minutest details. Not only this, but in a descriptive subject like operative dentistry, where the lecturer must picture with words the mechanical procedures of operations, he would better so plan his lectures that they follow as nearly as possible the order of the operation in the mouth. A student can better grasp a thing and retain it if it is presented to him step by step in its logical development with suitable landmarks at various points for the purpose, so to speak, of staking off the field of thought.

Different teachers probably have different ideas of what should be included in a course on operative dentistry, and no hard and fast lines can be drawn to divide the various subjects in such a way that it will apply to all schools. Each professor must arrange his work as best suits his individual needs and in a way to harmonize with the work of his associate professors in other departments. In the present paper no attempt will be made to specify in detail the topics to be considered in a series of lectures on this subject, nor to speak of the division of the work in the different years of the college course, but merely to use some of the standard topics as a means of illustrating the order of presentation to the class, and also to show how some of the topics may be divided into heads and sub-heads to make the lesson more vivid and the train of thought more systematic.

In teaching operative dentistry the class should first be impressed with the fact that no filling operations should be undertaken till the mouth is rendered hygienically fit to receive them—in other words, till all deposits are removed and the teeth properly cleaned. This involves at the outset a consideration of the subject of deposits on the teeth. This subject may be divided as follows:

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*Read before the Institute of Dental Pedagogics, Dec., 1902.

KINDS OF DEPOSITS; source, how deposited, distinguishing characteristics, location, and deleterious effects of each kind.

REMOVAL OF DEPOSITS; instruments and instrumentation, appliances and accessories, materials for the removal of stains, with the technique of the operation from beginning to end. In this connection it is well at an early stage of the lectures to make the lesson more impressive by calling for a volunteer from among the students to take a chair in the front of the class. The lecturer then demonstrates upon him the different plans of procedure in the removal of calculus from the various surfaces of the teeth. He can show the best positions to be taken by the operator, the manner of placing the patient, the method of bracing the operator's hand to guard against injury to the gums in the use of push-cut scalers, and other valuable suggestions of a practical nature which the entire class can see and appreciate. A few minutes' demonstration of this kind will make a more lasting impression upon the class than a whole hour's cut and dried lecture, and wherever through the course an opportunity presents of making a demonstration that all of the students can see and grasp, it is well to do so.

When a thorough grounding has been given in the best means of placing the mouth in a hygienic condition, the class should be told how to instruct the patient in the care of the teeth—the methods of brushing, the frequency, and all of the relationship existing between patient and operator, with their respective responsibility in maintaining oral hygiene. No opportunity should ever be lost by any lecturer to inculcate the principles of true professional relationships in the minds of his students, and it so chances that in presenting the subject of operative dentistry these opportunities occur very frequently.

Keeping the patient always as vividly as possible before the students in the lecture room, the next thing to consider after "deposits" is the subject of dental caries. That would come next in the order of work at the chair and it should therefore come next in the lectures. The etiology of dental caries need not be dwelt on in detail because that belongs to another chair, but there is a certain phase of the disease upon which it would seem desirable for the lecturer on operative dentistry to express emphasis. This relates to the manifestations of immunity and susceptibility, to the question of tooth material as it has or has not a bearing on the carious process, and to the possible relation of dental operations to the establishment of immunity in susceptible mouths. All of this has a most intimate relationship with operative procedures and it tinges the treatment of caries throughout. Then, again, great care should be taken to show the student the modus operandi of decay, the positions on the teeth where decay most often begins, with the reasons. This bears closely on the philosophy of cavity preparation, which immediately follows in its regular order.

The first thing to consider on this subject is the classification of cavities, with the reasons why cavities are so divided. Then take up the various classes and give each the special treatment it requires. For instance with proximal or proximo-occlusal cavities the first requisite in operating is to obtain space—with reasons. This at once takes us into a consideration of the significance of the interproximal space, the contact point, and kindred topics. When the necessity for obtaining space in contour work is thus impressed upon the student, the next step is to consider the different methods of separating teeth, with the indications for or against each method. This involves the question of materials for gradual separation, and the manner of using them; also the means to be employed in immediate separation or heroic wedging, such as the wooden wedge and the various kinds of separators, with the philosophy of force on which each one is based. In dealing with any appliance like the separator before a class of students great stress must be laid on the dangers from an indiscriminate and careless use of it.

After space has been gained the next consideration of the operator is to exclude moisture from the teeth during the operation, and this leads the lecturer into a study of the reasons why moisture is a bar to perfect work, followed by the various means to be employed to secure dryness. No detail of this should be slighted at this time, for instance when the use of the rubber dam is under consideration, it should include the kinds of dam, the size to be used for various positions in the mouth, the number of teeth to be embraced by the dam for each operation, the manner of punching the holes, the detail of applying it, together with the means of securing it in place during the operation. This includes a study of clamps, the various kinds of clamps, the indications for or against their use, their abuse, how properly to use them, together with the same line of treatment on ligatures and other means of retaining the dam. No detail of the actual operation should escape attention at this time, and the same with other plans for keeping cavities dry beside the rubber dam.

When dryness has been secured the actual preparation of the cavity begins. With proximal cavities there are several chief considerations which stand out prominently as landmarks for the student's identification. The first is the outline of the cavity, which involves the question of extension for prevention and the philosophy which underlies it, the next is the form of the cavity walls for retention of the filling, the next the removal of decalcified tissue in the deeper portions of the cavity, with the issues at stake pro and con, and finally the preparation of the enamel margins.

Then comes the technique of the operation—the instruments used and the manner of using them. This latter is also to a certain degree a review of the preparation of the cavity, stating, as it does, the form of the cavity walls in outlining the instrumentation.

Each class of cavities should be considered in the same detailed way, and then a note made of the exceptional cavities which sometimes occur in such a manner as to well-nigh defy classification. Unless something is said on this point the student is likely to be puzzled on encountering a cavity which he cannot classify, and instead of using his judgment and studying out an intelligent plan of procedure he will frequently stand helpless in the face of what he conceives to be the unknowable. The aim should be in all college teaching to develop the individual thinking and reasoning faculty of the student, and the exceptional cases form an excellent medium for emphasizing this.

In connection with the preparation of cavities the subject of hypersensitive dentine comes up and must be considered in all of its phases, the medication (in brief), the instrumentation, and the temperamental control of the patient.

The next subject to be taken up after cavity preparation is filling materials. The list of filling materials and their combinations in use at the present time should first be given, and then a detailed consideration of the physical character of each material and each combination. This leads to an observation of its advantages and disadvantages, together with the indications for or against its use. A brief outline may also be made of the methods of preparing filling materials for the purpose, though the chemistry of this subject belongs to another chair.

The method of manipulating and inserting the material in the cavity should be considered precisely in the order in which the operation is performed in the mouth. For instance, in dealing with gold, after studying the characteristics of cohesive and non-cohesive gold, the subject of annealing gold, and getting an insight into the various forms of gold on the market, such as crystal gold, deposit gold, etc., the question of the force to be applied in condensing gold naturally brings up the subject of pluggers and mallets. Before a mallet is used it should be well understood, and this involves a study of the condensing power of the different kinds of mallets, together with the philosophy and applicability of hand pressure. In considering the use of the mallet the effect of its impact on the peridental membrane calls for a close observation of the best methods of using a mallet, and also of suitable means for protecting the peridental membrane against injury from mallet force. With all of this vividly in the mind of the student, he is in a receptive mood to follow the insertion and condensation of the filling. The manner of building up the gold in the different classes of cavities should then be explained in detail, the placing of the pellets or cylinders of gold, the direction and force of the mallet blow, the form of pluggers for the various positions, and all of the minutiae of the operation to the final hardening of the surface of the filling by repeated mallet impact.

The next consideration is the trimming and polishing of the filling with the various appliances and materials for that purpose, thus carrying the operation to its logical conclusion.

This same method of treatment must now be carried out with all of the various filling materials, including inlay fillings, which latter require a very careful and a really specialized consideration in view of the radical difference in principles involved from that of ordinary filling.

The next subject for discussion is that of the dental pulp. It frequently becomes involved in filling operations and might therefore be thought suitable for consideration in connection with the preparation of cavities, but it is a subject so different in character from that of filling teeth that it is deemed best to reserve it for a special place in the lecture course.

The approach of decay near or to the pulp raises the question as to whether the pulp shall be protected and saved or destroyed and removed. The indications for and against pulp capping should be very carefully considered in view of the importance of the subject, and then the methods given for capping the pulp in those cases where the indications are favorable. The different means employed for destroying the pulp in cases of hopeless exposure should then be considered with the indications for or against the methods. This involves a study of sealing agents for the cavity during treatment and all the means to be employed for safeguarding the soft tissues against injury in the use of escharotic agents in pulp destruction.

When the pulp is removed the next subject in line is the preparation of the canals for filling, the management of small and tortuous canals and all of the technique of this important operation. Then comes root filling, with the materials to be used and the manner of using them.

The consideration of dental alveolar abscesses in their pathological and surgical aspects comes under the head of other chairs, but the operative procedures involved are properly within the province of operative dentistry and may be considered at this stage.

The study of erosion, abrasion and kindred topics also demand attention from an operative point of view.

Then comes the management of children's teeth, the teeth of nervous individuals or those broken in health, and the teeth of elderly persons.

This, with a general summing up of the whole subject, and the practical consideration of the keeping of records of operations, and other office management so far as it relates to the conduct of the operating room, rounds out what may be made a very complete course of lectures on operative dentistry.

In thus outlining topics for discussion no attempt has been made to arrange the details of the various topics except in one or two instances, very briefly, by way of example. It is left for the individual lecturer to formulate his headings in his note-book as best serves his individual purpose. This does not imply that this arrangement is a matter of secondary importance. In fact, to cover the subject adequately and with the smallest loss of time, it is of the highest importance that systematic and sequential headings be formulated for every topic, but in the opinion of your essayist this is as far as note-making for the lecture room should go. In other words, the lecturer should so prepare himself upon his subject that he does not require any prompting from his note-book except merely the headings, and those only for the purpose of keeping the subject running consecutively and to avoid any possible omission. The moment a lecturer has to consult his note-book for anything more than this, that moment he loses the magnetic influence over his class, which is one of the chief factors in every lecturer's success. Nothing in the way of reading from the note-book should ever be tolerated in a subject like operative dentistry, and if a lecturer finds it necessary to do this there is only one of two things for him to do—either make himself so familiar with the subject that it pours from him spontaneously without prompting, or else resign his chair and take up other work less laborious and more suited to his inclinations.

As a suggestion of how the headings in the note-book may be arranged for each topic, the following is offered as an example in cavity preparation:

Proximo-occlusal Cavity in Bicuspid.

1st. Cavity outline—Why?
2nd. Forming cavity for retention. Gingival wall—Why? Buccal and lingual walls—Why? Anchorage step—Why?
3rd. Removal of decalcified dentine in deep portion of cavity. Rules—with reasons. Treatment.
4th. Enamel margins.
5th. Technique of entire operation.

This may seem a very bare outline and yet those headings contain material enough for several lectures. There is no objection, of course, to a lecturer making a greater number of sub-headings for his guidance, but the better way, according to the writer's notion, is for the lecturer to go over the subject the evening before his lecture, and so saturate himself with the topic that notes are unnecessary. There is an inspiration to the class in a spontaneous and off-hand presentation of the subject free from repeated recourse to the note-book and with the lecturer constantly looking his students in the eye, that can obtain in no other way. Not only this, but the details of treatment in the various topics of operative dentistry change from year to year as our ideas change, so that the re-writing of detailed notes each year would become burdensome. With headings this is not so much the case, and the changes necessary are very slight. This does away with the baneful habit of attempting to lecture year after year from the same old musty set of notes.

PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

A regular meeting was held March 3, 1903, with the President, Dr. Elgin MaWhinney, in the Chair.

Dr. J. H. Prothero read a paper entitled "Studies Upon the Expansion of Plaster of Paris, and its Bearing on the Use of this Material for Impressions and Models."

Dr. L. O. Green followed with a paper on "A Method of Using the Logan and Davis Crowns."

DISCUSSION.

Dr. L. P. Haskell:

I have but little to say, and only upon the first paper. This matter of the expansion of plaster has been discussed for many years, and while it is true that there is expansion, it amounts to so little I have never realized that it interfered with the success of an artificial denture. This I say after an exclusive experience in artificial dentures for fifty-eight years.

I use plaster in all cases for impressions. Of course, it must be used correctly, in order to secure good results. I consider it important to fill an impression soon after it is taken.

I want to ask Dr. Prothero a question. In taking an impression the plaster expands, does not this of course contract the space? Upon filling the impression the plaster expands but only in one direction and that outside. Is not the model slightly smaller than the jaw?

As to the expansion of the plaster when filled into a plate affecting the shape of the plate, I have never seen such a result, finding the plate will still fit the die.

In his experiments, what effect has Dr. Prothero found to result from the use of salt as affecting the expansion?

I have spoken simply from the standpoint of experience, and facts are stubborn things.

Dr. E. X. Jones:

I expected to discuss the second paper, which I understood to be on general prosthesis, but I find it is a paper on the Logan and Davis crowns. I do not know very much about either one. because I use a different kind of a crown. I have, however, used the Davis and Logan crowns simply in the form of a temporary crown, but I do not see where either has any advantage over a properly constructed porcelain crown. If you properly trim the root of a tooth and make a cope to properly fit it, I do not see where there is any advantage in using a Logan or Davis crown with the cope. If a facing is gound properly to cover up the band on the labial or buccal side, I think the porcelain we have nowadays is sufficiently strong, when baked properly, to stand any strain we may have in ordinary mastication.

As to the practical use of crowns, I think that if the dentists in the country were in the habit of using a Richmond or a porcelain crown, use it properly, and trim the root properly, they would not use a banded Logan, or banded Davis in preference to the ordinary Richmond or all porcelain crown.

Dr. A. W. McCandless:

I wish to say a word upon Dr. Prothero's paper first. The doctor has gone into his subject quite exhaustively and on practical lines. I thank him for it, as I have learned a number of good things that I did not know before. Although not exactly germane to the subject, our minds naturally revert to the use of plaster for impressions, and in as few words as possible I will give my method of using plaster for impressions and models. After obtaining the impression in the usual manner, I scrape it on the surface representing the hard palate, then after obtaining the model, which is done as quickly as possible, adapt to the model accurately a sheet of Ideal Base plate wax. This is easily done by using a minimum oxy-hydrogen gas flame to soften the base plate. The trial plate is now carried to the mouth. If the plate does not adhere firmly the parts of the model representing the soft tissues are trimmed and the base plate adjusted to that. Repeat the operation until the adaptation is such that the base plate is removed with difficulty, then I know my model is in good shape for either a metal or a rubber plate. I am aware of the expansion of plaster. but its effects are overcome in this way. I presume Dr. Haskell trims his impressions and models in the same way. There is no difficulty in getting snug fitting plates.

I have had no experience to speak of with banded Logan crowns, and no experience with Davis crowns.

I have seen clinics given where bands have been made for Logan and Davis crowns, and it has always seemed to me that I could make a porcelain crown in the usual way with much less trouble and in much less time than I would require in making a banded Logan or Davis crown that would suit me as well. When Logan crowns came out a good many years ago, I put on a large number without bands and some with gold bands. It seems to me that, up to date, the porcelain crown, made by attaching the facing to the previously constructed cap of platinum, as Dr. Jones has already described, then adding the porcelain body in properly blended colors, is the ideal crown. As regards strength, we certainly get it in the porcelains we are now using. Only a few days ago a man came into my office with a lateral root broken. This root had been crowned six years ago with a porcelain crown such as I have described. The patient had accidentally bitten on a bone and instead of breaking the crown he fractured the root, which convinced me that that crown was strong enough.

An agent of the manufacturer of the Davis crown called upon me to show me how much more transparent and how much more natural in appearance the Davis crown was than the form of porcelain crown I make. I happened to have one that was quite dark and showed it to him. We held both of them up before the electric light. Mine was translucent up to the pins, and his was translucent up to the hole that is made in the Davis crown to receive the metal post. When the cement goes in the translucency is gone. I do not see any advantage the Davis crown has over the crowns we make now, and I prefer to make the latter, because I can do it in less time.

Dr. G. W. Pitts:

The paper of Dr. Green refers strictly to individual cases. With reference to the Logan crown, I cannot see the advantage of it for general use over other crowns.

Dr. L. P. Haskell:

I wish to call your attention to two models I hold in my hand. You will say at once they are what are considered unfavorable ones.

In general aspect they are similar but in one respect are totally dissimilar, but are typical cases.

The one in my left hand is the worse of the two. Absorption has progressed till nothing is left but a flexible ridge, except upon the right side, necrosed bone had been removed, so there is a solid condition of one-half inch. Like 98 per cent of jaws, the center is hard, requiring a "relief" or thin film of wax so the plate shall not rest upon the center and rock, as would result from the yielding ridge, bearing in mind that it is the only portion of the upper jaw which never changes, while in all cases there will be sooner or later, change to some extent in the alveolar ridge. If an air chamber were used the posterior and anterior margins would rest on this hard center and rock.

In two per cent of jaws the center is soft and usually a crevice is seen. In these cases the plate should be fitted to the entire surface, making no change in the model.

In using air chambers the patient must act, by sucking the air from the chamber. In case of the "relief" all that is necessary for adhesion is to press the plate in place.

Dr. H. A. Cross:

I do not wish to enter into the general discussion regarding these papers, but I wish to emphasize a new point that has been brought out by Dr. Haskell. He spoke of the absorption of the alveolar ridge being greater when rubber plates were worn than metal. I may be behind the times in that regard, but it is an idea I have never heard before. I simply call attention to it as a point that we ought to know.

Dr. George B. Perry:

In regard to the paper of Dr. Prothero, the scientific study of the expansion of plaster of Paris is comparatively new to me. I never have seen any articles on that subject, therefore I am particularly interested in it. I had an opportunity of examining the micrometer which he has manufactured, and I must say that I was greatly surprised to know that plaster continues to expand for at least twenty-four hours. How much longer that expansion goes on, I do not know. I was greatly surprised to notice that in one instance there was an expansion of 158-10,000, which must have an effect on the ill-fitting of some plates. The subject is well worthy of our consideration, and personally I appreciate what Dr. Prothero has had to say on it and the work he has done.

Dr. Hart J. Goslee:

I had not intended to discuss either of these papers to any extent, because I did not think I knew anything about the subjects, and have no desire to take up the time of the society. Still I cannot help but pay tribute to the excellent essay of Dr. Prothero upon a subject which is of some scientific importance and value. While, as he has said, the subject of the expansion of plaster of paris is quite an old one, and has been discussed at a greater or less length for a number of years, yet it is still an important one, and I believe the work that has been done by him is along the most correct scientific lines that have as yet been advocated or adopted, with the view to correctly ascertaining the cause and incidentally the overcoming of this expansion. I do not know as to the accuracy of the deduction that he makes when he says that. in his opinion, the expansion of plaster of Paris is the principal cause of ill-fitting dentures. I am not sure just how correct that statement is, as it relates to the proportion, but the expansion of plaster undoubtedly causes a good percentage of ill-fitting dentures, and if Dr. Prothero, through his investigations, or anyone else, can overcome this expansion there is no question whatever but that better fitting dentures, and a smaller percentage of ill-fitting ones, will result.

As to the point mentioned by Dr. Haskell, we know how he prepares the model by elevating or adding to those portions which represent the hard tissue in the mouth. This has a double purpose, in that it not only relieves the riding of the denture upon the hard palate, and thus enables us to obtain uniform pressure, but it also overcomes the expansion of the plaster, which, as he says, takes place in the center of the palate because of being farthest removed from the point of resistance offered by the sides of the tray. If we, by scraping that portion of our impression which represents the hard parts in the palatal surface, or by adding to those surfaces on the model, elevate them, we of course secure a more uniform pressure of the denture upon the tissues of the mouth, and this, as I indicated a moment ago, has a double advantage in that it also overcomes any increased prominence at that particular point which might be caused by expansion.

I believe that if Dr. Prothero can carry out this course of study or experimentation until he can overcome this expansion, we will also to be able to overcome, to a great extent, a good proportion of the vast number of ill-fitting dentures which we now have, and I want to express my appreciation of the work he has done along this line.

A word or two in regard to the essay of Dr. Green. There is no question at all but that the employment of the Davis and Logan crowns on the anterior teeth particularly is often most useful. They possess an advantage which we do not get from any other style of crown construction, and that advantage is the greater translucency of porcelain, as well as the increased strength. It is, I believe, conceded that a porcelain crown, whether constructed with a facing and backed with porcelain body, subsequently properly vitrified, or with a Davis or Logan crown, is stronger than a metal back crown. The additional strength is due to the fact that the porcelain is more solid, and that it is retained or secured by virtue of greater surface contact than is the ordinary facing that is backed up, because in the latter the facing is retained by means of the attachment pins only, hence the strength of the porcelain crown exceeds that of a metal backed crown, without doubt. In the use of either a Davis or Logan crown, a band is invariably indicated, for permanent operation, but should be as narrow as possible. In the employment of these crowns we must observe this feature in the selection: The dimensions of the base of the crown must be greater than the dimensions of the cap, because the cap should be placed well down into the body of the crown, and the porcelain must be ground to overlap the band at all points. This is essential, for the reason that there is no physical union between porcelain and platinum, and it is practically impossible to cover the edge of the platinum cap, as is desirable unless this is observed. I use the term "cap" instead of "cope" because it is generally accepted as preferable and more correct. If we desire to cover any surface of the platinum cap with porcelain, we must have some mechanical means of retaining the latter, such as is thus afforded by having the crown larger than the cap, so that it may overlap at all surfaces. There is no question at all but that such a crown has a place of usefulness, and serves the purpose as well, I think, as any one style of crown will.

A disadvantage in the use of the Logan and Davis crowns, however, lies in the fact that we have to confine ourselves to a smaller selection. The molds of facings, supplied for our use for this kind of work, number into the hundreds, thus giving a great variation for selection, while the molds of the Davis and Logan crowns are probably less than fifty, so that we must necessarily confine the selection to a much smaller number. The main advantages possessed by such crowns are strength, combined with the beautiful, natural, translucent, esthetic effect, afforded by the splendid molds in which the Davis and Logan crowns come to us.

Dr. J. E. Hinkins:

I have been waiting to hear some one speak of the chemical properties in connection with the expansibility of plaster of Paris. I have not had time to look up the subject from a chemical standpoint, to be positive; but it is a well-known fact that if we take plaster of Paris in iss amorphous form, and mix it with water of the proper consistency for taking an impression, it will take up fifteen or twenty per cent of water in crystallization if it is used in the mouth. That is one reason why we get expansion of the plaster. When it is used in the mouth and is taken out, it then absorbs oxygen from the atmosphere, changing it from the sulphate of plaster to the oxide of calcium, and it increases the expansion. I am not positive as to the amount, but I will look it up. To my mind, it is quite feasible from a chemical standpoint why we get expansion of plaster of Paris, as mentioned by the essayist in his paper.

Dr. Prothero (closing the discussion):

As it is getting late I will occupy but a moment or two of time in closing the discussion. Dr. Haskell asked in regard to the efficiency of salt for controlling expansion of plaster of paris. In the experiments conducted so far, salt did not seem to control this movement as well as potassium sulphate. That it does exert a modifying influence there can be no doubt.

He also mentioned something about the model contracting instead of expanding. His idea was that during the expansion the plaster on the inner rims of the tray would also expand, and since these surfaces approach each other, the width of the model would be decreased. Admitting this to be true, the bulk of plaster being only about 1-16 to ⅛-inch between the inner side of tray and the surfaces impressed by the buccal alveolar ridge, the movement is very slight, or perhaps only 1-16 of that which occurs across the palatine portion. Hence, this expansion will by no means compensate for that across the model from the center of ridge on one side to the center of ridge of the opposite side.

I will admit that good adaptation in denture construction is frequently secured, and that the large proportion of dentures constructed are not failures, but the failures that do occur are, I believe, in most cases, directly traceable to warpage of impressions or models, or both.

In arranging this paper it was not thought necessary to enter into the minutiae of impression taking and model construction, since all know the details of these steps, how the hard areas of the mouth should be favored by scraping the impression opposite these points, and the soft areas compressed by scraping these points on the model. I have endeavored, as nearly as practicable, to confine the paper to the movement occurring in plaster of Paris during and after setting, with the hope of creating such interest in this subject that all of you may observe it more closely and record your observations that you may assist in finding some means or medium by which expansion can be controlled. Should I be able to find the means, I will be glad to make it known.

Dr. Green (closing the discussion):

I want to say, that I am afraid my paper was somewhat misunderstood. I probably use a greater variety of crowns in my practice, or as many anyhow, as any dentist in Chicago. I do not put a banded Logan, or a banded Davis crown on everything that comes along. I make a great many full baked porcelain crowns in my practice and I simply reported these crowns for your consideration. Each and every case has its own surrounding conditions. The banded Logan or Davis makes a beautiful strong and practical crown when the conditions are indicated.

I feel as if I ought to apologize for not furnishing a copy of my paper to those who were to discuss it until a few minutes before the meeting was called. Everything considered, however, I was well pleased with the discussion.

NINETEENTH ANNUAL MEETING OF THE MINNESOTA STATE DENTAL ASSOCIATION, ST. PAUL, SEPTEMBER, 1902.

Discussion of the Paper of Dr. Van Duzee on "Our Professional Future."

Dr. R. C. Brophy:

I feel that I would be unfair to myself if I failed to express my appreciation of the essay just read. It is a paper presenting many commendable characteristics. The outlook for our profession's future is certainly a broad theme. It is a subject upon which none of us are specialists, and consequently any of us can participate in its discussion with a pretty full assurance that there will be no one present who has absolutely unassailable qualification to prove what we may say to be fallacious.

It must be a pessimistic man indeed who sees ought but brightness in the general outlook for our profession; yet, gentlemen, this brightness is not exactly the brightness of the noonday sun of a cloudless summer day; the thoughtful student of the subject must discern flecks of clouds athwart the profession's sky. While the essay covers certain phases of the subject most admirably, yet I must confess that I was disappointed and surprised in listening to it to find that the practical side of the question had been ignored by the essayist. While ethics, and the following out of ideal fraternalism undoubtedly has, and will continue to have a potent bearing upon our profession's future, yet I believe there are other considerations more weighty than these and I had hoped that the essayist would touch upon these considerations, or at least some of them.

It would be a good thing for dentistry if at meetings such as this the ordinary matters of practice were considered more freely. There is a general and rapidly growing tendency in our profession to ignore the commonplace. Men seem to think that the gaining of professional prominence is dependent upon their quitting the beaten paths. This, of course, betokens progress and advancement and should not be disparaged, but it seems to me that it is well for us to devote more consideration to old commonplace matters. It pays to glean the fields sometimes, it oftentimes pays to screen the chaff. It pays nowadays to sift the coal ashes. It is a mistaken idea of progress to think that it means altogether evolving of new ideas, new methods of practice. There are many old things in dentistry that the wisest can revert to occasionally with great good to the profession, and without prejudice to their intellect or dignity. Our professional future is not altogether a sentimental question, there are very many practical things that ought to be considered in connection with it.

Dr. Thos. B. Hartzell:

This paper really does not admit of discussion in the sense that we have much right to differ from the opinion of what he has put before us. It is a classic, and while I do feel that it is in my province to discuss it, I cannot allow this occasion to pass without saying that I most heartily commend the sentiment of the paper from start to finish.

Dr. R. B. Wilson:

I want to thank Dr. Van Duzee for that paper. I enjoyed it as much as any paper I ever read. There is one thing that impressed me very much, and that is where he speaks of the young man and the old practitioner coming together. I really do not think that the old practitioner realizes what an influence he has over the younger men. I am one of the young men and I make mistakes, and it does me good to have old friends here in the city, old practitioners to whom I can go and who will tell me of my mistakes that I can profit by them. When a young man is just starting he meets with many failures and sometimes he feels disheartened. If you have a friend among some of the old practitioners to whom you can tell your troubles and he takes you by the hand and cheers you up it is worth a great deal, and it creates a feeling in us that we want to help somebody else when we get a chance. I think when we do not do some one else a good turn when we have an opportunity the profession is going backward. The doctor also spoke of going out of the wa yto get some one to come to these meetings. I know of one young practitioner here in the city who felt almost lost, he was a stranger and he thought all the people were taking him in. If you meet a fellow practitioner and you can say only a few words to him, if you give him a hearty shake of the hand it encourages him. I want to thank Dr. Van Duzee again for the paper.

Dr. L. P. Leonard:

The paper is characteristic of the essayist, full of honesty. There is one point I would like to emphasize why the profession of dentistry is not in a stable condition to-day. It is in a crucial state more or less, and I think it would be well for each individual to become as conscious as he possibly can of his personal doings, for it will have something to do with shaping the great profession of dentistry. We should try to impress upon ourselves that our individual efforts have a great deal to do with the shaping of the future of dentistry. Let us all make an effort to do good, honest work and thus advance the profession.

Dr. G. W. Cook (Chicago):

I want to express a feeling of gratitude to Dr. Van Duzee for that paper. The principles discussed are fundamental, and the subject is to my mind a very important one. He mentioned the fact of the profession looking after the poor, looking after such individuals as cannot pay for good work and not let them get into the hands of incompetent and dishonest men because their work is cheap. In the larger cities it seems to me this is one of the most important branches of work for the profession to take up if we are going to obtain the largest and highest possibilities in educating the public and in educating the younger dentists for their work in the profession. There are many of us who are not yet so old, and we can look back a few years when we came into the profession and think of the men who really impressed themselves upon our minds as the men we would like to associate ourselves with as members of the profession. And in this connection I want to pay a tribute to two men here in Minnesota. The first six months after I opened my office in Chicago two members of this association called on me. One of them was standing in front of my office one morning (I think he got up earlier than I did) and he looked at me a few moments and said, "Are you a dentist?" I said, "I have a diploma." He said, "Do you practice in here?" I said, "Yes." "Well," said he, "I am a dentist and I saw your sign and thought I would call on you." I said, "I am very glad to have you come in." I had about thirty cents worth of office furniture, but he came in and that did not seem to make any difference with him. He was attending the World's Fair and came in a number of times to see me during the two or three weeks that he was there. I never forgot that man. When I came here the other day I saw his face and it was a joy to look at him. That was Dr. Murray. A short time after that another fellow, who is about 6x26, came in and said to me, "I have an uncle here and I would like to use your office and instruments to extract a tooth. My uncle lives in one part of the country and I live in another, and I want to relieve him before he leaves town." I told him to go ahead and make any use of my office and any instruments he wished. He came in, pulled out a great big syringe, played something into his uncle's gum and pulled the tooth. He was a decent sort of a fellow and I have been attracted to him ever since. That was Tommy Hartzell. (Laughter.) To attract the younger men in professional life, that is the thing. If you go to them in a sort of a swellhead way and try to make them believe that you are "it" you are practically shutting off the very thing that should enter into professional life and leading them in the wrong direction. One of the very interesting things to me in this association is that fraternal feeling which seems to exist between the old men and the young. They all seem to be of about the same age. Some fellow said here the other day that he was thirty years old in the profession; he is among the older men, but I could not tell the difference. It is a pleasure to come to your meeting, and especially when you have a man in your midst who can write such a paper. I think St. Paul will have a free dispensary for the poor and those fellows who are going round advertising that they will make plates for three dollars will have to go out of business, raise their prices or do better work.

I have said too much on this subject, in fact, I have said nothing on the subject, but I am interested in certain phases of it, and the principal one is to give the young men a chance. Show them the courtesy that they deserve. A man will find his level no matter what walk of life he is in. (Applause.)

TENTH ANNUAL MEETING OF THE INSTITUTE OF DENTAL PEDAGOGICS.

Discussion on Dr. Johnson's Paper, "The Systematic Arrangement of Lectures on Operative Dentistry."

Dr. W. S. Hosford, Iowa City, Ia.:

Mr. President:

I am in such thorough accord with Dr. Johnson that I cannot criticise anything he has said. I can only accentuate one or two points mentioned by him. First, the preparation of a diagram or syllabus of each lecture; this to be placed on the board so that each student can copy it and use it as a means for future study and collateral reading, as well as recitations on this subject. The use of teaching models and instruments for demonstration is also a good point.

Most of us are coming to the semester plan of dividing our college course; each semester to consist of nine weeks during which time the student is taught certain subjects or parts of subjects. At the end of each semester he is examined in that subject or part so that we can ascertain just what results we are getting in our work. I believe that is a very good plan. Personally, I wish to thank the essayist for the very clear and logical paper which he has presented. It cannot fail to be productive of much good.

Dr. George E. Hunt, Indianapolis, Ind.:

According to his paper, Dr. Johnson does not begin teaching operative dentistry where I do. I first take up the anatomy of the mouth and endeavor to impress my students with the idea that I know all about the muscles of mastication and the osseous tissue entering into the oral cavity and its adjacent parts. I then take up the anatomy of the teeth and follow that with lectures and quizzes on development and on histology. I am then ready to talk on operative procedures. In these lectures I also teach oral pathology and therapeutics. To my mind oral pathology and therapeutics are inseparable from the teaching of operative dentistry. The same lecturer should handle these subjects. When I begin talking on the conservation or extirpation of the dental pulp I just have to talk pathology and therapeutics, and I do so.

I do not agree with Dr. Johnson that a lecturer should not write out his lectures. I do agree with him that the lecture should not be read. There is no chance for argument there. But I write out my lectures quite fully and take the manuscript to class with me. I may not look at it once during the hour but writing them out impresses them on my mind and I do not leave out things I had intended to say. It is before me simply as a memory refresher.

It has been argued that this method insures the lectures being the same year after year but that is not so with me. Every other summer I rewrite my entire course and all through every year I am adding copious notes to those I already have. In this way I am far more likely to be in position to give my students the benefit of all that seems good in operative dentistry than the man who relies on memory alone. In fact, the man who relies on memory alone is apt to be a narrow teacher. He teaches only what he does; other methods are neglected.

Dr. Henry W. Morgan, Nashville, Tenn.:

It gives me great pleasure to add my word of approval to the essay you have just listened to, and when it has been re-read by teachers of operative dentistry and a syllabus made, it will be found to cover very thoroughly every subject properly belonging to that chair.

In those institutions where a text book on dental anatomy is not used, a series of lectures on Dental Anatomy would come in logical order before "cavity nomenclature." It has been my privilege to teach this subject to the students of the first year, thereby giving me an early opportunity of becoming acquainted with the class and thoroughly grounding them in the nomenclature which is to be used in the lecture room, and technic laboratories, of the second and third year.

The essayist's plan of arranging the subject of the course in the order of the "operation in the mouth" seems to me both wise and sound. It affords both student and teacher, at any time in the session an opportunity to reflect upon and digest the work already gone over, and permit the introduction of outside subjects, without breaking the continuity of the course, so naturally does the subject already considered suggest that which is to follow.

I feel that when I have endorsed the idea, I have really endorsed the paper as a whole and have left little to be said, since there is nothing to take exception to. We are to be congratulated, as well as the essayist. In my work I have always added after the removal of calculus from the teeth and treatment of the gums, a lecture on tooth powders and mouth washes.

I most heartily approve the declaration of the essayist, that the aim of all college teaching should be the "development of individual thinking and reasoning." Dogmatic teaching is therefore to be avoided. We should rather appeal to the intellect of the student than his memory. If you will pardon a personal allusion, I will speak of one other point in the paper, I have always felt the need of notes referred to, and while there can be no debate of the proposition laid down that they should be few and brief, that the lecturer should command the eyes of his students, if he would reach their souls and stir their enthusiasm, a full list of properly arranged topics will frequently enable a speaker to present in logical sequence a subject, without which, he would say but little worth a student's remembering. Nothing tires a class so quickly as a teacher reading from his note or any other book. It is fatal even to have to consult an authority before a class, in fact there should be no book taken into the lecture room to be consulted. It is much better to admit ignorance than to be detected in a pretension. Candor, frankness, simplicity, these are the attributes which should characterize the teacher's attitude toward the student. High sounding technicalities are cloaks for ignorance. The essay under discussion is a fine example of the fact, that a man with a message needs no high sounding phraseology or ambiguous terms.

Dr. H. L. Ambler, Cleveland:

The good sensible essay to which we have just listened, might be termed the philosophy of teaching operative dentistry, because it proposes the application of philosophical principles to the process of teaching for philosophy does not necessarily deal with another world, but with present facts, and they are what the teacher encounters at every lecture and demonstration, and "he must take his bearing from the fixed stars, and not from the shifting scenes and lights of the lower atmosphere."

"The philosophy of teaching is the explanation of the teaching process by means of universal law. By it the separate acts are brought not only into unity among themselves, but into the unity of the complete system of growth."

There is some science in teaching, but we feel that there is a great deal of art, and from what the essayist has written we think he has fully exemplified this fact. We do not go beyond the bounds laid down by the essayist, when we refer to what a teacher should be. The born teacher has tact and personal insight which he brings to bear in every act of teaching, and he knows that great gain is made by planning his work, universal law guides his hand and inspires his heart.

The essayist has shown that his teaching is a process consisting of a series of well defined steps, which he takes to bring about the much desired end, and all good teaching has these organic elements. A knowledge of the results of previous methods in teaching is necessary for the conception of useful ideas, and for the system of carrying these into effect. Strictly speaking, teaching is a mental process, but a great deal of dental teaching combines the mental with the mechanical process, and some go so far as to claim that the diagram method, model method, and laboratory method are the vital ones.

That the order of presentation of any subject should be carried from the fundamentals to minute details, as the essayist proposes, is certainly the proper method, and thus it is well for example, in presenting filling materials to a class of students to begin with the simplest and easiest understood and manipulated, viz.: gutta-percha, cement, amalgam, tin, and gold; treating of their physical and, to some extent, of their chemical properties.

In operative dentistry a large portion of the teaching is didactic, but we believe any lecturer will find the need of at least partially demonstrating some of his lectures, so as to be sure that the class understands him; a large part of the remainder being left for the chair of operative technics and the demonstrators in the operatory. After lectures and demonstrations on a given subject have been completed, there should be a sufficient number of quizzes held, so as to be sure that the student comprehends all of the main points presented, and to correct all false impressions, and the student will often remark, that the quiz was of as much value to him as any portion of the work.

If demonstrators have been taught in your own college, they will be familiar with your way and try to apply it, thus saving time and perplexity; it is much better for a student to know one good way of doing a certain thing than to have faint ideas about two or three ways of doing the same thing.

It has been said of the Englishman in general, that he is nothing if not systematic. If we could truly make this apply to all dental teaching, then it would be a step in advance. The courses in different colleges are largely the same, but even if a teacher does overlap the work of some other chair, it does no harm provided they are in agreement, because there are many things that a student needs to be told about more than once. What one chair does not teach another should, and this can be determined by the teachers going over together a list of the subjects they think properly belong to them, and at the same time considering the extent of detail each one cares to teach.

We observe that the essayist does not rely entirely upon didactic teaching, and here we agree with him, and have often called for some member of the class to act as a subject for demonstration, for students generally prefer to see a thing done, rather than to hear it talked about, and if they remember anything, it is what they see.

The manner of studying is of as much importance, as how we study and what we study. A student should be taught to remember principles, and not phraseology, and then there will not be a struggle at quiz time to recall some forms of words: this is one objection which has been brought against printed questions and answers.

It would redound to the advantage of both operator and patient, if more instruction was given students in oral hygiene, the teaching of which should include the care of bridges, and all prosthetic work, and this naturally comes to the chair of operative dentistry, unless there is a special lecturer on oral hygiene, which some colleges have.

In a recent newspaper we saw a dentist's card which read, "Dr. B——, Prophylactic Dentistry." Was he not aiming in the right direction?

The essayist makes a slight reference to ethics; we believe that subject should be taught by the chair of operative dentistry, if there is not a special lecturer, as a few schools are fortunate enough to have, but the matter should be well exemplified by all the teachers, and referred to whenever occasion permits.

Porcelain inlay operations may or may not be considered by the chair of operative dentistry, as agreed upon by this chair and the one of prosthetic dentistry, either will answer, only so the student obtains the necessary instruction.

Erosion, abrasion, and we would add atrophy, all to be treated from an operative standpoint, should be included in the chair of operative dentistry.

If there is not a special lecturer on dental history, we think a few lectures and quizzes—not less than five or ten—should be devoted to it by the chair of operative dentistry in every college, thus adding dignity and respect to our calling. No other profession would consider such a proposal as not to teach their students the history of their specialty, and they often add collateral history. Doctor Brophy in his address at Stockholm said, "The leaders in educational work, both general and professional—excepting professors in dental colleges—have but a meager knowledge of what dentistry is, and what the varied and difficult duties of the dental practitioner are, while many people of culture, people well informed on almost all subjects, have only the most crude ideas of dentistry and dental practice." This being the case it seems highly important that we should instruct the student in history so that we can help educate the public in this respect.

Any lecturer is liable to make an entire omission, or to misplace a part of his subject if he does not use note headings; it is better to use them and thus place a subject before the class just right the first time. It is not easy to undo mistakes; the first statement made is the one that the student is most liable to remember, it is like being introduced to a person who is incorrectly named to you, and afterwards you learn his real name, but you never see him without calling to mind his incorrect name. Mistakes may not ruin the teacher, but they injure the student. Ignorance of the teacher is not a valid excuse, because the fact of his accepting the position implies a pretension to the proper skill and learning.

Teachers must originate and guide their classes; they should be men who stand in the front rank of their specialties as scholars, thinkers, and investigators, and be thoroughly versed in its literature, and of broad mind to enable them to see the relation of their specialty to the entire body of science.

There is a degree of natural talent, of mental power, which all consider desirable in a teacher, and surely he should have an earnest desire to make himself useful in the highest degree to those whom he teaches.

Every teacher who occupies a chair should be so imbued with the importance of his own work, that he thinks all other chairs are of secondary importance; to such men as these we are indebted for very much of our progress, because they think, reason, and invent along their special line, and they talk about the good things they know, and they push them along to success. Given a faculty composed of such strenuous men, they will constitute the very best faculty a dental school can possibly possess, and they will attract and impress students as no half-hearted men can; their highest reward is an approving conscience and the satisfaction of bringing their pupils up to the highest attainments. We believe, as a rule, that students will pay attention to the chair of operative dentistry better than any other chair, for the average senior cannot see anything but a gold filling, and it is about the height of his ambition to produce a perfect one.

Immediate results are not always the best; it takes time to impress a student, and more time to produce a good dentist. Great advancement has been made in ways and means of teaching, but perfection has not appeared. The method which the essayist has given us is systematic, cumulative, and brings a proper and natural sequence which makes it very interesting to the student. We might say that the accomplishments of a lifetime have been put in an hour-glass."

This is an age when the man who thinks and reasons, is the one most likely to succeed, and the public will look for him in all departments of life, and dental schools should do their part in developing these qualities.

Dr. Geo. E. Hunt, Indianapolis, Ind.:

Dr. Ambler stirred me up on the teacher question, and I want to say a word on that subject. I believe that the good teacher in dentistry, or anything else, is the man the boys love. I would not give the snap of my finger for any teacher on any subject whom the students do not like. A teacher should be able to carry his boys with him all the time, no matter whether he is choice in the selection of his infinitives, or whether he indulges in the use of a little slang now and then. When he talks the class should believe every word he says; they should be his, no matter what language he uses to express his thoughts. You know that as a rule the sky-soaring orator is not the man the boys put much faith in, and I don't blame them. Carry your class with you and you will be a success as a teacher.

Dr. W. C. Barrett, Buffalo, N. Y.:

It would appear that Dr. Hunt, judging from his remarks, teaches anatomy, therapeutics, something of materia medica, all of pathology, orthodontia, operative dentistry. and several miscellaneous subjects from his one chair. It seems to me that that is concentrating altogether too much in one little body. I do not know how deep his pond is—as far as I know it is unfathomable—but I should imagine that it would run dry after a while. I cannot conceive that that is the best way for the average man to teach. It cannot be thorough. For my own part I teach pathology, nothing else, and I give about sixty lectures on oral pathology alone without attempting to make any reference to an instrument or its use. It is my good fortune to be connected with the same faculty with which the essayist is connected; we have interchanged ideas on the subject of our mutual duties and we have no clashing whatever, and he gives a thorough course of lectures. I give as thorough a course as I can. He talks about operative dentistry, and I about pathology; and we both have all we can do. I believe that in the early days of teaching in dentistry all of pathology was taught from the chair of operative dentistry; but I am of the opinion that we ought to have gotten beyond that by this time. Pathology should be a chair by itself and not a branch, and a small one at that, of some other chair. There is certainly enough to teach in operative dentistry proper to occupy all the time and attention of one professor, even a man as capable as Dr. Johnson.

I think we should differentiate between the practical part and the theoretical; that is, betwen the practical and theoretical part of operative dentistry. Operative dentistry in its most exclusiveness is the foundation of dental practice, and it certainly should occupy all the time that one man can give to it in one course of lectures. The theoretical is the real pathology, not simply the symptomatology, but a study of the pathologic changes which take place within the tissues as a result of malnutrition. That is not properly a part of the department of operative dentistry and I am glad that Dr. Johnson takes the same view of the subject that I do. He has all he can do to teach operative dentistry, according to the Johnsonian standard, and so will any one else in that department, or in any other if he sticks to the subject in hand.

Dr. H. A. Smith, Cincinnati, O.:

Dr. Johnson has given us a most excellent paper. I came here especially to hear the paper and I am not sorry that I came. I wish now to refer to what Dr. Hunt said of the regard the student should have for the teacher. I would infinitely rather have the respect of the student than his love. I think it is going too far to attempt to have a class love the teacher. If I can get the respect of my class that is all I can hope to get.

As to the point Dr. Barrett made with reference to teaching pathology: I understand Dr. Johnson to say that he taught some pathology. I think he teaches more than Dr. Barrett thinks he does. I do not see how any teacher of operative dentistry can make his subject clear to the student unless he teaches something of the pathology of dental caries for example. I teach special pathology, but the general subject of pathology is remanded to the lecturer on that subject. I think it is a good plan to have the general subject of pathology taught by a special teacher, but let the teacher of operative dentistry talk pretty fully on what is called oral pathology.

With regard to the method of following notes while lecturing: Dr. G. V. Black, who is known to be a superior teacher, told me a number of years ago that for many years he had burned everything behind him each year. He said that he had never kept any notes excepting perhaps, some statistical matter which had caused him a great deal of work. After a time, when you become experienced, it will not require much time to make fresh notes. If you are a constant student of dental literature it will not be hard.

I am surprised that Dr. Hunt could not succeed in the way indicated. A man of his ability and experience should not fail even if he has not his notes before him. I know from my own experience and observation that the man who delivers a lecture with the fewest possible notes is the most effective teacher.

Dr. M. C. Marshall, St. Louis, Mo.:

As a teacher of operative dentistry I was particularly interested in Dr. Johnson's paper, and I was delighted with the syllabus the doctor presented. I go a little farther back than he does. He began with the hygiene of the mouth. I begin with the sterilization of the instruments and the hygiene of the hands of the operator. I want to say also that I cannot agree with Dr. Johnson in the use of one term, and that is the word peridental. I agree with him when he says that the teacher must be saturated with his subject. It is the concentration of thought, born of enthusiasm, that makes us fit teachers; and that is the condition for one's mind to be in to present the subject properly to the student. I tried to use notes once thinking that I too might evade a stroke of paresis, but in referring to them I became entangled somewhat and as a consequence became so embarrassed that I suffered from a stroke of diaphoresis, which I assure our friend Hunt is infinitely worse than the other.

Dr. G. V. Black, Chicago, Ill.:

Young men, when beginning their work in teaching operative dentistry or anything else, should write out what they are going to say very carefully; study it thoroughly, then make their notes and leave their writing at home. This will give them an opportunity to formulate what they want to say, get the proper words and the proper idea clothed in good language so that when they appear before their class they will make a good impression and gain the confidence of the students. Of course, some men read with such facility that they teach almost as well from the paper as without it. Possibly some men will do better but not for long. Very soon they should throw away their paper and depend entirely upon formulating the thing before they go to the classroom. Certainly notes should be made even by the older men among us; the headings at least.

I certainly should not undertake to teach anatomy in a course of teaching in operative dentistry. That belongs to another chair. The anatomy of the teeth and the various parts of the mouth should be given by the anatomist. Neither should I undertake to teach general pathology. Operative dentistry, as we know it to-day, deals with caries and its treatment, and the pathology of caries stands by itself. Whenever we touch a dental pulp we are into something else.

We divide operative dentistry, as it is generally known, into technical procedures in operative dentistry, pathology of caries and operative dentistry. I begin to teach operative dentistry after the student knows how to fill teeth. The filling of a tooth is a mere mechanical operation, and has nothing to do, except as a mechanical procedure, with the arrest of decay. What we want to teach in operative dentistry is the arrest of decay, the conditions under which it may be stopped there and then, if that is practicable, or what is best to do when that is impracticable. That is operative dentistry. When we come to the removal of pulps, the treatment of the soft tissues in connection with the teeth, the peridental membrane, then we are in another field of pathology. It is pathology and therapeutics that we are dealing with then, and it is distinct and apart from operative dentistry. It is too much, gentlemen, to attempt to combine these chairs of pathology and operative dentistry. Of course, we may teach as a technical procedure the filling of roots of teeth, and all that; dealing with the subject in the light of mechanical procedures, purely technical, but we must remember that they are only the technical procedures of operative dentistry and not operative dentistry itself. When we come to deal with operative dentistry, we are dealing with conditions and restorative processes, the relief of distress. The technical procedures are simply a means and are taught as mechanical principles. How we shall lay the margin of a filling to gain the best results comes afterward. Here we are dealing with conditions; we are studying the pathology of decay and laying our plans for its arrest; and it is in this higher sense that we should teach operative dentistry.

Dr. D. R. Stubblefield, Nashville, Tenn.:

I wish, to commend the paper that I have read and that I have enjoyed hearing read, simply because it occurs to me that it is almost ideal in its singleness of aim. If there is anything in the world that I admire it is that ability to see the object aimed at and to allow nothing extrinsic to deter your attention until you have reached the goal. Dr. Johnson's resume of his methods of teaching is one built upon such a definite purpose; therefore, it is not diffiuclt for me to imagine him carrying these things in his mind. He does not have to hesitate; there is a straight blazed path and when he sets his feet in that, each part suggests that which is to follow. It is logical; it is single; it is definite; it is intelligible. So that, without being a critical man from the teaching standpoint, I must congratulate myself on having heard on exposition of a teacher's method that is ideal to me.

I attempt to do all this in my own work. I first mature my subject at home, and if I find that I cannot succeed in grasping a clearly defined conception of it, I feel that I am uncertain and unreliable, and I never cease until I have it definitely before me. Then I do not want any notes. I have a message; I have a conviction, and it is not difficult to get the thing which carries it and brings you to the end.

With reference to note-taking: I think that the practice of note-taking, especially in the early stages of our teaching, is necessary. It is done merely to keep the untrained mind in the harness, as it were. You must have a message to convey, and to do that these captional headings are sufficient. It is wrong to attempt to pile it all into a manuscript, for if an obliteration of the definite path occurs, then you are off your feet and are in a rather deplorable condition. A manuscript is always a non-conductor between the reader and his audience. But when the manuscript is used only as a captional heading, whether fully written out or not, it becomes a sign-board directing you along the course you are to travel. We must train ourselves in that direction. Commence to make the briefest outline that will carry you along the road, and base it upon a well-defined conception of the object aimed at. Then, and then only, can we hope to succeed as teachers in any department of dentistry.

What Dr. Johnson presented to us to-day is logical, because he imagines himself operating on a tangible subject, and the students recognize his reasoning as well as the wisdom of his remarks, and, of course, they gladly follow him.

Dr. Geo. E. Hunt, Indianapolis, Ind.:

I should be pleased to have either of the three gentlemen who cannot teach operative dentistry come to our college and I will try to do something for them, and yet I have my notes before me. I do not read them, and I said so very distinctly, but I have them to refer to in case of necessity. I rewrite these notes once every two years. I can remember them better when I do that. I would be very glad to hold a party in Indianapolis, and I will give any of the gentlemen a few points in regard to teaching operative dentistry.

Dr. W. E. Grant, Louisville, Ky.:

I want to commend Dr. Johnson's paper very heartily. I have listened to the discussions so far, and from my standpoint it seems to me that the criticism of not covering enough is not justifiable. My observation in looking over the question of operative dentistry, and what the various teachers are trying to cover in that department, is that the average professor of operative dentistry, devotes more time to subjects that are foreign to operative dentistry than he does to the subject itself. This thing of devoting two or three months to anatomy, and the same amount of time to pathology and only about six weeks to operative dentistry is a great mistake and overlapping too much on other teachers.

Dr. J. D. Patterson, Kansas City, Mo.:

I cannot appreciate what is the difference between operative dentistry and operative dentistry. A great many seem to be able to appreciate that difference but I am not of that number. So long as the fact remains that in actual practice the great majority of operations are in conjunction with pathological conditions, it is difficult to see just how operative procedures, and operative procedures combined with pathological conditions can be divorced so readily in teaching. It is well to divorce them if that is possible, on account of the time that is necessary to cover them both, but how this can be done is a puzzle to me. Therefore, operative procedures must perforce take into consideration pathological conditions and must be taught together.

I do not believe that in teaching operative procedures the professor should also teach the anatomy of the teeth. It seems to me that this should be taught entirely separate.

What I want to say more particularly is what Dr. Johnson said so well in his admirable paper in regard to the practical demonstration of operative procedures. I am a teacher of pathology, but not like Dr. Barrett who teaches nothing about instrumentation. When it comes to the treatment of pathological conditions, then we should practice instrumentation upon a dummy or upon a student, and it is a method that teaches my students far more than I can didactically. This is especially true when we consider the subject of cleansing of the teeth, and the treatment of conditions arising from calcic deposits. That is something that cannot possibly be taught didactically. I am extremely fortunate to have a set of teeth I picked up in the dissecting room, badly affected with pyorrhœa in its various stages. I had those jaws prepared for my own use and with a student in the chair and the jaws beside me, I proceed with the proper instruments, showing the position of the operator, the exact sweep of the instrument, and the proper instrument to be used.

I have done this because I found after teaching students for two or three years in regard to this important operation of cleaning the teeth in all stages of diseases, that when I go into the infirmary I see the students' utter incapacity, and it is wrong to expect anything else if we teach this most important subject by didactic work alone. It must be demonstrated practically and I have thus taught some men in my school to be expert operators in the treatment of pyorrhœa alveolaris.

Dr Johnson (closing the discussion):

First, I wish to take you back to the title of my paper. It ran something like this: "The systematic arrangement of lectures on operative dentistry." It was not intended to include all the things taught in operative dentistry. Neither did it pretend to draw a line between the different subjects taught in every college. There should be a distinct understanding between the teachers of different chairs so that the subjects may be in perfect harmony. It is impossible to draw a sharp line of distinction between different subjects and apply it to every college. It would not work well. When Dr. Hunt spoke of all the things he taught in his college I said to myself, as I looked over at Dr. Barrett, that Dr. Hunt is evidently not teaching operative dentistry in the same institution in which Dr. Barrett is teaching pathology. And that proved true.

As to writing out lectures: I admit the truth of Dr. Hunt's argument that it is an excellent way of learning a subject, and in my early days of teaching I wrote out all my lectures, but I assure you that after the first lecture I delivered to my class I never attempted to read a lecture afterward. During recent years I have not been writing out the lectures at all.

THE ODONTOGRAPHIC SOCIETY OF CHICAGO.

FIFTEENTH ANNIVERSARY CELEBRATION, FEB., 1903.

TUESDAY AFTERNOON SESSION.

Dr. W. Warrington Evans, of Washington, D. C., read a paper entitled "The Possibilities of Prosthetic Dentistry from an Esthetic Standpoint."

DISCUSSION.

Dr. W. M. Bartlett, of St. Louis, Mo.:

Mr. President: I feel highly honored in having been selected to open the discussion on a paper written by so eminent a man as Dr. Evans. In discussing this subject I am placed somewhat in the position of the man who is called upon to defend his own family. The charges made by Dr. Evans against the dental colleges I cannot allow to go unchallenged, and I shall endeavor to show that he has made a most grievous mistake. He attributes lack of interest and ability in this great branch of prosthetic dentistry to the inability of dental colleges to teach this branch as it should be taught. I would like to ask the gentlemen present if the great profession of medicine expects all of its raw graduates to have the ability to perform a major operation in surgery? Does the profession of law expect a recent graduate to charge a jury with all the skill and ability that an old practitioner can command? No. The dental college, like any other institution of learning, is nothing but a school in which to drill the fundamental principles involved in the profession into the students. You cannot make a dentist in twenty-one months, but you can give him the idea upon which he can lay his foundation that in future years he may become an honor to his profession. It is not the fault of the dental college, but the fault of the graduate himself. What does an ambitious graduate of medicine do? Does he immediately enter the field of competition? No. If he is financially able, he seeks higher education under men who are skilled in certain lines. He takes post-graduate courses. If he is not financially well fixed, he associates himself with an old practitioner who can give him valuable ideas. In law and other professions the same holds good. Wherever you find a man who is ambitious for higher education, in perfecting himself in one special branch of his profession, in that man you will find a success. But in the man who enters into the field of competition after the almighty dollar, in that man you will find a complete failure. There is no disputing this point. A young man entering this profession upon receiving his diploma should associate himself with a man of ability. He should devote two or three years of his life to the study of his profession under a man who is competent to give him practical ideas. The practical side of his profession can never be acquired in a dental college—never. His failures must build his successful foundation. Operative dentistry and mechanical dentistry are the same. It is prosthetic dentistry. One places the prosthesis in the cavity of a tooth, and the other places the prosthesis where the teeth have been lost. There is no distinction.

It is with sorrow that I notice the trend of the times in criticising our institutions of learning. We should not do it. You should lift up, bear up, be with us, as we are doing the best we can. As to the test of a student's mechanical ability, if Dr. Evans can tell how we can test a student as to his mechanical ability, well and good. But I have seen students who, upon entering a dental college, had a grounded knowledge of machine mechanism. They were good machinists, and they could use the file, the lathe, etc., successfully, but who could not apply mechanical skill to dentistry. Again, I have noticed other students entering dental colleges who had no outward appearance of having any mechanical ideas, but after matriculating they gradually progressed, and by the time they completed their course, they developed mechanical skill that had lain dormant in them, and at the end of a few years made magnificent mechanical men. Until Dr. Evans can tell us how to devolop this trait, we must admit students.

The college curriculum has been advanced to four years, and I hardly think we can turn out competent mechanical men in that length of time. We must remember that in the branch of mehcanical dentistry we have more to grasp than we have in the branch of operative dentistry. We have a different class of work. The greater portion of our profession consists of mechanical dentistry. We cannot teach a student in the short time of twenty-one months or twenty-eight months mechanical dentistry. It is not like operative dentistry. We have twins and triplets in operative dentistry, but in mechanical dentistry every case that presents itself is different in some respect. If Dr. Evans kept pace with the times, he would find that, in regard to the curriculum, the present plan has been adopted by the progressive colleges for years: The first year is devoted to technic work, the taking of impressions from subjects, placing impressions upon articulators, the carving of teeth, molding of teeth, the making of dummy plates, and carrying it on gradually through the first course, until we have completed the denture. The next year is taken up with metallic work, and in the third year we come to the high ideal class of work, such as porcelain. I do not believe a knowledge of general anatomy is absolutely necessary for the mechanical man, but notwithstanding that it is not necessary, he should have a thorough knowledge of anatomy if he cares to practice his profession. To my mind, chemistry is the greatest study that a mechanical man can take up. Futhermore, the possibilities for the mechanical man in chemistry are greater than in any other study he may follow.

The Bonwill system, as Dr. Evans has justly stated, is a good theory. We should look to Dr. Bonwill, but unfortunately, we cannot carry out his theory in all cases, but even if we can carry it out only in a few cases, we owe that man a debt of gratitude.

As to porcelain teeth, Dr. Evans stated that he does not care to advertise any firm; neither do I, nor to break down any firm. But the firm he recommends as giving us the most practical teeth, I should say, gives us the most inferior teeth. There is no shape to the teeth in the buccal region, no masticating surfaces. The same teeth that were constructed twenty years ago we will find in that establishment today. The only change is the pins are smaller.

My idea of teaching the great branch of prosthetic dentistry is this, that the work you lecture upon you should do before the class; show your students that you are competent to do the class of work that you teach, and your students will then respect you. You may lecture upon a subject for hours, giving them the theory, but when the student leaves the class-room, perhaps he has not grasped the most important points of the subject. If you lecture as you progress with the work, the student not only hears, but sees, and this makes a deeper impression upon his mind.

Dr. F. H. Berry, of Milwaukee, Wisconsin:

In this paper the essayist says, in speaking of prosthetic dentistry, that it cannot be acquired any more than we can change our temperament. We can improve our condition, but our birthmark remains indelible. Gentlemen, I think you are convinced from the last two days of the flood of prosthetic dentistry that has been exhibited here, that the pool of prosthetic dentistry is open to all, and if you will jump in you can be washed as white as snow, no matter what your birthmark may be.

With reference to college work, there has been so much said about it that I feel a little embarrassed, but being in that work, I cannot help but touch on it. College work is not weak, exactly, but the teacher is working against the desires and ambitions of the students. They enter upon the study of dentistry with the same ambition as they would enter upon any mechanical trade. They are then graduated with mechanical technic, and in the rush all else is lost sight of by them for the time being. Is the dental college the place to teach the esthetic part of prosthetic dentistry the first few years of college life? I say, no. A man must first learn to do before he can appreciate or realize; he has got to educate his fingers before he can associate himself with the esthetic part of it. Didactic instruction will do more toward teaching prosthetic dentistry than a technical laboratory, particularly with regard to the expression of the face, the material, etc.

One other point that Dr. Evans touched upon. He says the noble scientific men of today, who are laboring to place dentistry on a plane equal to medicine, will never succeed, so long as there are so many degenerates in their fold. Gentlemen, prosthetic dentistry may rise higher and higher, but it will never lift dentistry up to a place on a line with medicine. Prosthetic dentistry has nothing to do with our relation to the medical profession. They are so wide apart, and we must look to such men as Dr. Kirk, and others, to lift us to that plane. Prosthetic dentistry will never do it.

The four-year college course will not help esthetic dentistry very much. It will give students more time to become mechanical men, so that, after they go out of college and enter active practice, they will be better manipulators and more competent to portray their work of art in an esthetic manner.

Regarding the testing of a man's technical, mechanical qualities by a preliminary examination, before entering college, it is not a test of what a man may develop into after he has been given a fair chance under good training. I have watched some of my students and some of those who, at first, did not seem to know the difference even between a file and a scraper, yet they turned out later on to be the best mechanics in the class. I have no doubt that as they went out into practice and further developed that ability, they turned out to be first-class prosthetic men.

A few words in regard to another feature brought out in the paper. I do not believe it is necessary to study the temperament of patients as regards the construction of suitable dentures, but we should learn to compare them with nature. For instance, the ladies in selecting wearing apparel do it with a high sense of comparison. It is not an inborn sense in them. It comes to them gradually, and particularly with reference to colors. In the matter of colors, they know what is pleasing to the eye, and they make their selections accordingly.

Dr. John Q. Byram, of Indianapolis, Indiana:

I wish to compliment Dr. Evans on the work he has done, but, like the preceding speakers, I cannot agree with him in all he has said. As. Dr. Bartlett said, we turn men out of colleges at the end of three years, having given them as much work in prosthetic dentistry as we can. We must remember, gentlemen, that conditions have changed in the last ten years. Up to fifteen years ago, what was the result? Nearly every dentist practicing at that time extracted hundreds of teeth each year that we are saving today. Operative dentistry has advanced, and whenever we have an advancement of one branch, it is always at the sacrifice of another. It is not because the dentist does not want to do this work in prosthetic dentistry so much, but if he is a conservative dentist, as he should be today, the result is that in the conservation of the teeth he necessarily must do less prosthetic work. And we will admit, I think, that all of us are not naturally skillful, like Dr. Evans and a few of our other prosthetic dentists of the United States. We must be doing things continually in order to become proficient. It is the same with the student; you must keep him working day in and day out. If one stands at the chair and fills teeth for five or six hours a day, and does little prosthetic work, what is the result? He naturally loses in that branch, and I believe, gentlemen, that is one of the explanations for the conditions as we have them all over this country today. Let me say to you, and I am sorry that this is true, we condemn our advertising dentists for constructing dentures for five or six dollars, or two dollars, whatever they advertise to construct them for. But as long as the average reputable dentist does not take any more interest than he does, and gives no better results, we cannot blame people for going to men and paying five dollars for their plates if they get as good results as they can get from reputable dentists for ten or fifteen dollars. I may as well say right here, that many of the plates made by dentists who are considered the best in the cities in which they practice are no better than the plates made by some of our advertising dentists; and when it comes to the finish of plates, let me say that the advertising man's plate, in nearly every case, is far superior to the other. This is largely due to carelessness on our part. If we want to become proficient, we must keep at it if we have the time. If not, I think it would be well to refer our prosthetic work to men who are specialists along this line. If a man is a specialist in prosthetic work, why should he not be a better man than the average dentist who does only a little of this work from time to time? Take our friend, Dr. Johnson, the President of this Society, who makes a specialty of operative dentistry. I dare say, he does not attempt to construct dentures, for the reason that his work is along another line. Dr. Evans' specialty is prosthetic dentistry. He does more of that than anything else, and why should he not be more proficient?

I cannot agree with the remarks of Dr. Berry in reference to studying the temperamental conditions of patients. There is one of the mistakes we make as dentists. We do not study the temperaments of our patients as we should. I think that Dr. Berry does study temperamental conditions, but does not realize that he does so. We do not do this enough.

I cannot agree with Dr. Evans when he says that the S. S. White Company makes the best teeth that are made for plate work. I read a paper last year before the Indiana State Dental Association on "The Selection of Artificial Teeth for Full Dentures," and in that paper I made a plea for the revision of the molds, especially for bicuspids and molars. I spent much time in measuring the artificial teeth made by different manufacturers, and in comparing them with the average measurements of natural teeth, and I was surprised when I learned that in nearly every case there was not the proper size for the bicuspids and molars to make a plate. I think we make a mistake in buying our artificial teeth in sets of fourteens; I think we should buy them in sets of sixes and eights, and had better select cuspids of certain mold. In nearly every case it seems the manufacturers put fourteen teeth on a card, so that they would be of the proper size all the way through, and I believe by making certain measurements we can select better by dividing.

DR. L. P. HASKELL, of Chicago:

I have been much pleased with Dr. Evans' paper. He has in many respects hit the nail squarely on the head.

With regard to the teaching of prosthetic dentistry in our dental colleges, while there has been a great advance made in the last ten years, especially in the last five years, still there is much that is lacking. There is not time enough devoted to work in the prosthetic laboratory. A student graduates from a dental college far better prepared to fill teeth than to make artificial dentures. No one will dispute that who has made careful examinations and observations. There is too much of the student's time taken up in teaching prosthetic work didactically. There must be some didactic teaching of prosthetic work; but the time of the student taken up in the lecture room trying to do artistic things is labor lost. What is said goes into one ear and out of the other. The student does not comprehend it. Take a freshman class of say, two hundred, with three or four demonstrators, and sometimes these demonstrators are not the experienced men they ought to be. The demonstrator in a prosthetic laboratory ought to be a thoroughly experienced man, but often that is not the case, and there may be only three or four demonstrators for two hundred students. These students do not get the necessary instruction they ought to have, and oftentimes they depend one upon the other. One grasps the idea and puts it into practice, and then his neighbor gets the idea from him as well as he can. There should be some change in that direction. Let the lecturer, if he is a competent man, show how the work is done. The student will learn far more in that way than by listening to talks in the lecture room.

With regard to Dr. Evans' demonstrations here, I am very much pleased with them. I hope he will go on with that work, and very soon put into book form something of them for dental students and dentists generally, and it will be one of the best things he or anyone else has ever done.

Dr. Evans (closing the discussion):

I feel highly flattered at the remarks of the gentlemen who opened the discussion, as I was not aware of the fact that both were college men, but it only goes to show how close I struck the nail upon the head, judging from their attack upon my remarks. I must have been very close to the mark in regard to my criticisms of the dental colleges or they would not have attacked me so vigorously. Consequently, I feel highly honored at that.

I wish to correct one mistake that three of the gentlemen seem to have made. I do not think I made any remarks proposing to advertise the general manufacture of teeth by the S. S. White Company. I simply specified one particular mold. I am confident that

I can go into the local depots in this city and in all towns, and I will probably not find five sets of the mold to which I have reference, but I will find innumerable molds of the S. S. White Manufacturing Company that I would not, under any circumstances, debase myself by putting into a human head. I had reference, gentlemen, to the molds made by them several years ago in connection with celluloid. Those, I repeat, are the closest imitation of nature today in existence, of any molds manufactured by any dental firm. They are broad, fine molds. The bicuspids are closer to nature; the molars and centrals are closer to nature; they are more capable of being worked. You can do the work in one-half the time, and get finer expressions. Why is it so many men to whom I have shown some of my specimens have said to me: "Doctor Evans, I cannot get such teeth as those. Where did you get them?" I replied: "Go right downstairs and you can get them. The reason you cannot get them is that the majority of dental depots have got discouraged in carrying them. They can sell these rat teeth and every other color to the majority of dentists, because they like them, although these other teeth do not cost a penny more."

In regard to the dental laboratories, I would be ashamed to have admitted, as one of the speakers did, the fact that the dental laboratories were making teeth for other men who had not the advantages of being able to see the patients, who had not the advantages of studying the faces and the temperaments of patients, and then trying to imitate the individual nature of those persons, and yet he admitted that the work so turned out was far superior than that done individually.

Dr. Byram:

I stated, I believe, that we complain of the advertising offices making plates so cheaply, and I said that the average dentist was so careless in regard to making plates that he turned out no better plate than the men who run advertising offices, and I meant to say that such a dentist had better send his patient to someone who made a specialty of prosthetic dentistry.

Dr. Evans (resuming):

I will accept that statement. I do say this, that there are a number of laboratories in existence in every large city that do superior work as compared with that done by nine-tenths of the dentists at large, and if a dentist is not capable of doing such work himself, he should not do the injustice to his patient to attempt it, but should send his patient to a man who is capable of doing it.

In regard to the remarks of Dr. Haskell, I was very much pleased with them. I thank him for his consideration, because I look upon him as a man fully capable of judging of what he says.

Obituary.

DR. F. W. BLOMILEY, 1849-1903.

Dr. F. W. Blomiley was born in La Grange, Wisconsin, Aug. 3, 1849. He began the practice of dentistry in Elk Horn, Wis., in the year 1878 and graduated from the Indiana Dental College in March, 1882, when he returned to Elk Horn and continued in practice there until Jan., '85. He then moved to Sioux Falls, South Dakota, where he practiced until his death, Jan. 27, 1903.

Dr. Blomiley was one of the pioneer dentists of the State and one of the first members of the South Dakota State Dental Society.

He was a constant sufferer for thirty years from chronic dyspepsia, but his untiring energy kept him at his post until the day before his death.

The South Dakota State Dental Society at its last meeting in Redfield, voted that the Secretary be authorized to insert his obituary in some of the leading dental magazines of the West.

A CASE OF THUMBSUCKING.

BY W. A. HECKARD, D. D. S., INDIANAPOLIS.

The accompanying illustrations are from the same mouth, that of my little daughter. She would suck her thumb despite our best efforts to prevent it. She would chew off canvas mittens to get to her thumb, and while her arch was not injured the upper incisors were forced forward as shown by Fig. 1, taken at the age of four years and three months.

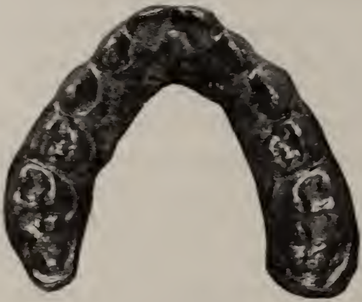

Fig. 1.

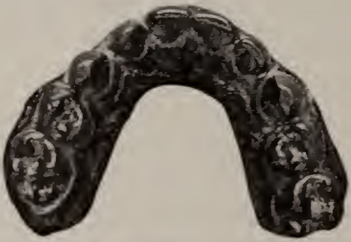

Fig. 2.

I finally gave her a bugle to play three times a day, five minutes each time, and in five months there was an appreciable change, as indicated in Fig. 2. She has not used the "horn," as she calls it, for four months, and the teeth have not changed since. Of course she has not sucked her thumb since she was first placed at the bugle.

THE DENTAL REVIEW.

Devoted to the Advancement of Dental Science.

PUBLISHED MONTHLY.

EDITOR: C. N. JOHNSON, L. D. S., D. D. S.

THE VACATION SEASON.

If a vacation is necessary for any class of men it assuredly is for dentists. There is no vocation more exacting, laborious, or grinding than the practice of dentistry. The physician is not confined to his office eight or nine hours daily from one month's end to another doing the same things over and over again. Neither is the lawyer pinned down to one kind of work continually with little to vary the monotony of routine practice in a narrow field. And then the dentist's work, standing as he does, most of the time, under a strain and with the added tension of working upon sensitive tissues, is of the most exhausting nature.

No constitution, however robust, is capable of standing up under such a stress and enabling its possessor to do the best service for his patients without an occasional change for recuperation. And this change with most practitioners must be absolute. It must be a complete getting away from the atmosphere of professional work, and the following of some congenial recreation or pursuit which renovates the man and takes the "tang" of dentistry out of him for the time.

Dentists make a mistake when they remain too constantly at the chair. They grow dull and overwrought, and lose that keenness of perception which is so essential to the best accomplishment. Let every dentist in full practice look into this matter and let him not do himself or his patients the injustice to ignore his annual vacations. He will find that in the ultimate he will be able to accomplish more and do it with greater zest than if he stays all the while at the treadmill.

By general consent the midsummer seems to be the accepted time for vacations. In a city practice most of the best patients are out of town, and in the country most of them are busy in the field, so that the dentist who makes it a rule to go away at this seaon will really not disappoint many of his patients, particularly if it becomes known that it is his habit to do so.

THE EDITOR'S DESK.

Charity Instead of Criticism

In the very excellent article of Dr. Van Duzee in this issue, reference is made to a question that always appeals to me. It is in relation to passing judgment on the work of a fellow practitioner without knowing the circumstances under which the work was performed. It is so easy to censure when the facts in the case are not all at hand, and they are seldom at hand when the second dentist sees the work. I have reached the point where I positively will not take a fellow dentist to task no matter what character of work I see from his hands unless there is unmistakable evidence of gross and palpable neglect amounting to malpractice, and even then I take him to task with a reservation and never with the knowledge of the patient.

There are some individuals for whom to do good work at particular times is impossible. And the deceptive thing about it is that frequently for these same patients at another time good work is easy of accomplishment. We have all seen this, and why is it that we will not render to our predecessor the same meed of charity that we would ask for ourselves under similar circumstances? The bedevilment of professional comity and ethics relates not so much to violations of the written code of ethics as it does to underhanded insinuations made against fellow practitioners before patients. We should of course at all times defend a patient against the malpractice of an unscrupulous dentist, but we can do this without comment or criticism. Our duty to a patient is simply to remedy any wrong which may have been done as best we can and not to discuss the author of the wrong.

Above all things let us cultivate charity for the shortcomings of others, especially when we have no means of knowing that apparent lapses are not accidental or unavoidable instead of deliberate and censurable. It is the basest kind of professional perfidy to always seek to undermine the reputation of a fellow practitioner, and the irony of fate usually wills it that the undermining reacts on the one who attempts it rather than on the one against whom it is aimed.

Soldering Bridges in Sections:—Did it ever occur to you to solder a twelve or fourteen-tooth bridge in three pieces first and then unite them with solder? It is easily accomplished if the following method is adopted: Set the teeth all up at one time, and with a bracket saw make three pieces of the case. Solder the cuspid, bicuspids and molar (or molars if there be more than one) of each side separately. Place them in the correct position in the mouth and take an impression. The bridges will remain firm in the impression and when the model is obtained it is an easy matter to set up the facings for the incisors and make a "six tooth bridge," for that is what it is resolved into.

HOMER ALMON.

Devitalizing Pulps:—How do you devitalize pulps? How do you account for the pain caused in some cases and not in others? Why does it take so long in some cases and only a day in others? These are only a few of the many questions that we hear, and I always try to have a reason when I can, but sometimes I cannot find one. However, since I began mixing my medicines as I use them I have noticed that results are more even and consequently more practical.

Arsenical application for instance: Take a speck of arsenious acid and a speck of cocaine and place on a slab. Add a drop of creosote and mix with cement spatula. Note if the net results are not nearer the same in most cases.

HOMER ALMON.

Adjusting the Rubber Dam:—In adjusting the rubber dam for any operation upon the bicuspids or molars, instead of using any of the various styles of clamps, with a ligature of waxed floss silk, tie a white glass bead about the size of a small birdshot, on the buccal and lingual surfaces of the tooth posterior to that which you wish to isolate with the dam.

Then with the requisite openings in the dam, slip the proper one over the posterior tooth, first stretching it over the beads and well down to the neck of the tooth. It will stay exactly where you put it, and the other teeth involved in the adjustment are easily managed. If you wish you can use the beads on each tooth. After the dam is so adjusted you have no clamp impinging on the gum causing pain and anoyance, but with the rubber entirely out of the way for any of the ordinary cavities, and your patient comfortable.

Norfolk, Nebr. H. J. Cole.

To Set a Crown or Bridge with Gutta-Percha:—Put about an inch square of ordinary pink gutta-percha in a small porcelain butter dish, and pour half a drachm of chloroform on it. Have everything clean and dry. With a small spatula scrape enough softened gutta-percha to perfectly cover the inside of your crowns and pins. In a few minutes the chloroform will evaporate sufficiently so you can heat, on your electric or mica gold annealer, and try on in the usual way with the roots of teeth wet so the gutta-percha will not stick. If not enough gutta-percha, dry with spunk, and add a little more, if too much take off a little. When just right, dry your roots thoroughly with whatever method you are familiar. Heat your crown or bridge hot on the annealer, have a heavy kid glove on your right hand, pick up the crown or bridge with the gloved hand and place it quickly and firmly in position, using whatever method you are accustomed to in driving home,—only taking care that it is not too hot, and that you have properly protected the tongue and lips with a napkin. Do not use the same piece of gutta-percha twice, but always take a new one.

Bloomington, Ill. George D. Sitherwood.

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MEMORANDA.

FIRST DISTRICT DENTAL SOCIETY OF ILLINOIS.

The twenty-first annual meeting of the First District Dental Society of Illinois will be held in Macomb on September 15 and 16, 1903.

Roseville, Ills. H. W. McMillan, Secretary.

WHERE WE ALL QUAIL.

"Colonel," asked the beautiful grass widow, "have you ever really known what it was to be frightened?"

"I should say I have," replied the gallant warrior. "At the dentist's office the other day I could actually feel the blood congealing in my veins when he came at me with his buzz saw."—Record-Herald.

THE TEXARKANA DENTAL SOCIETY.

A society with the above name has been organized at Texarkana, Arkansas. It has a very promising outlook and we wish it success. The following is a list of the officers and members: P. A. Skeen, President; T. A. Sims, Vice-President; A. E. Chambers, Secretary-Treasurer; J. B. Reed, F. D. Bittle, J. L. Moseley, L. W. Dancy, and A. Crossley—the latter of Atlanta, Texas.

ALAMEDA COUNTY DENTAL SOCIETY.

The name of the Oakland Dental Club (California), has been changed to that of the Alameda County Dental Society, with the idea of broadening its field. An interesting program has been arranged for the coming year. The following is a list of the officers: President, Joseph Loran Pease; Vice-President, Wm. F. Schwaner: Secretary, Jas. G. Gilbertson; Treasurer, Walter F. Lewis.

APPROACHING SUCCESS.

A Moscow dentist has invented a system whereby false teeth can be made to grow into the gums as firmly as natural ones. After a few months' use it is just as hard to extract them as it is to dislodge the genuine molar, made on the premises. Soon, possibly, this tooth grafting Muscovite will achieve, suggests the London Globe, that giddiest height to which the dentist can soar, the manufacture of false teeth that ache.

NEW ORLEANS COLLEGE OF DENTISTRY.

We call special attention to the fact that the Board of Directors have purchased a new location for the College at No. 831 Carondelet Street, and that the contract has been let for the building of a large Infirmary and Lecture Hall to be completed by the 15th of September, 1903. This building is located in a prominent street and surrounded by boarding houses, all of which are in walking distance, and at prices of board to suit the convenience of each student.

RECENT PATENTS OF INTEREST TO DENTISTS.

731337. Dental pliers, Calvin S. Case, Chicago, Ill.
731030. Dental flask press, Wm. Finn, Cedar Rapids, Iowa.
731302. Attachment for dental engines, John C. Holson, Ord, Nebr.
731246. Fountain cuspidor, John V. Trenaman, New York, N. Y.
731849. Dental preparation for use in the operation of capping pulps, Abram L. Bower, Boyertown, Pa.
731674. Dental plate and making same, Harry L. Finnell, Peoria, Ill.
731586. Upper cuspid forceps, Francis S. Manning, Versailles, Mo.
731594. Porcelain crown for teeth, Wm. H. Mosley, Midland, Canada.
732044. Dental plugger, Alden Bush, Columbus, Ohio.
732288. Dental forceps, Kuno Felsch, Elberfeld, Germany.
732662. Dental medicine receptacle, George B. Smith, Fremont, Ohio.
732387. Dental engine, Julius B. Wantz, Chicago, Ill.
732922. Pivot pin for teeth, Egbert A. Clark, Washington, D. C.
733320. Dental securing device, Wm. E. Griswold, New York, N. Y.
733321. Dental jig, Wm. E. Griswold, New York, N. Y.
733061. Composition for dentists' tapers, Leo C. Mandel, St. Louis, Mo.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

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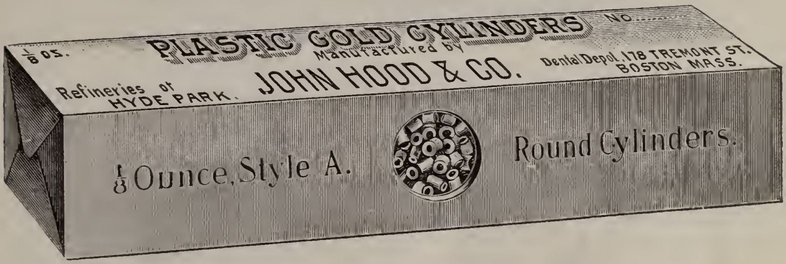
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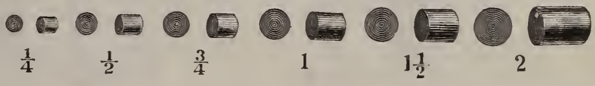

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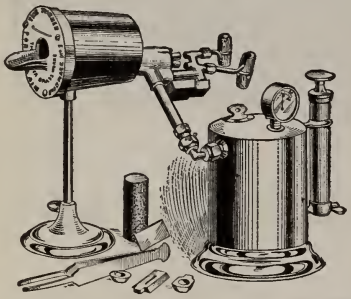
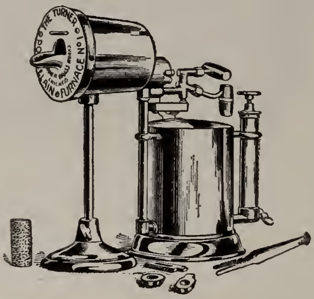
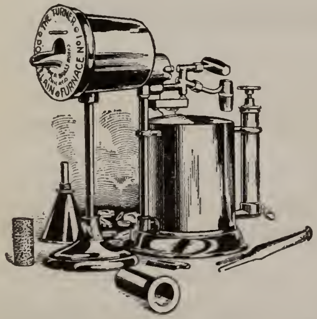
TURNER Gasoline Porcelain FURNACES

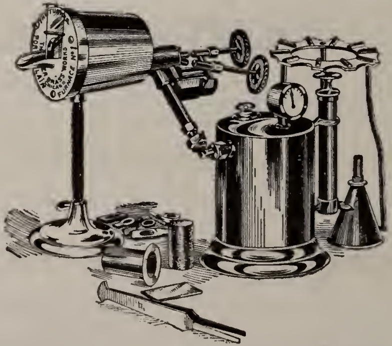
are giving satisfaction wherever used. They bake porcelain quickly, produce the best results, are easy to operate, can be used where gas and electricity can not be obtained, and are preferred by all who have compared their superior qualities to any and all others.





No. 140.	Outfit	$30.00
No. 40D.	Blow Pipe only	10.00
No. 41.	Outfit	$21.00
No. 4D.	Blow Pipe only	6.00





No. 14.	Outfit	$26.00
	N. P. Automatic Funnel	1.00
No. 160.	Outfit	$35.00
No. 60D.	Blow Pipe with N. P. Automatic Funnel	15.00

No. 1 Porcelain Furnace includes 1 set Fire Clay Slides, 1 Nickel Slide, 1 Fire Clay Stopper, 1 pair Pliers, 1 Mica Slide........ $15.00

THE TURNER BRASS WORKS
32 North Franklin Street, – CHICAGO
SUPPLY HOUSES ACT AS AGENTS

DAVIDSON

Velvet Rubber Dam

This Velvet Rubber Dam is made from the finest selected Para Rubber and will always be tough and of uniform quality. It is put up in the medium and thin grades, and in 7½ and 15 foot lengths. Packed either in tin or pasteboard boxes. The tin box keeps it in good condition longer, as it excludes the air.

Hard Rubber Dental Handles

Made of the best materials and carefully finished.
Screw fits all standard tools.

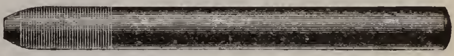
NO. 10

NO. 12

NO. 10A

NO. 13

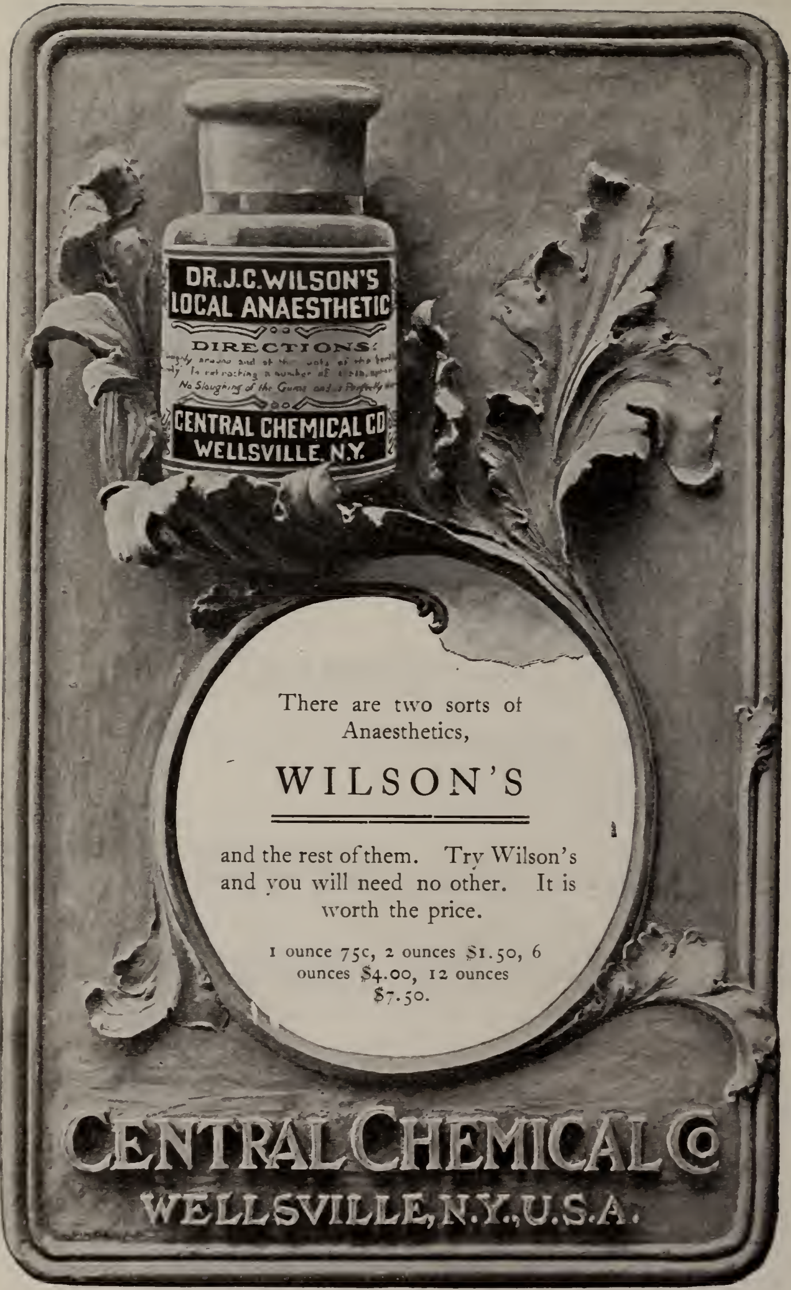
NO. 11


NO. 13A

DAVIDSON RUBBER CO., Boston, Mass.

AND FOR SALE BY

All Dental Dealers



There are two sorts of Anaesthetics,

WILSON'S

and the rest of them. Try Wilson's and you will need no other. It is worth the price.

1 ounce 75c, 2 ounces $1.50, 6 ounces $4.00, 12 ounces $7.50.

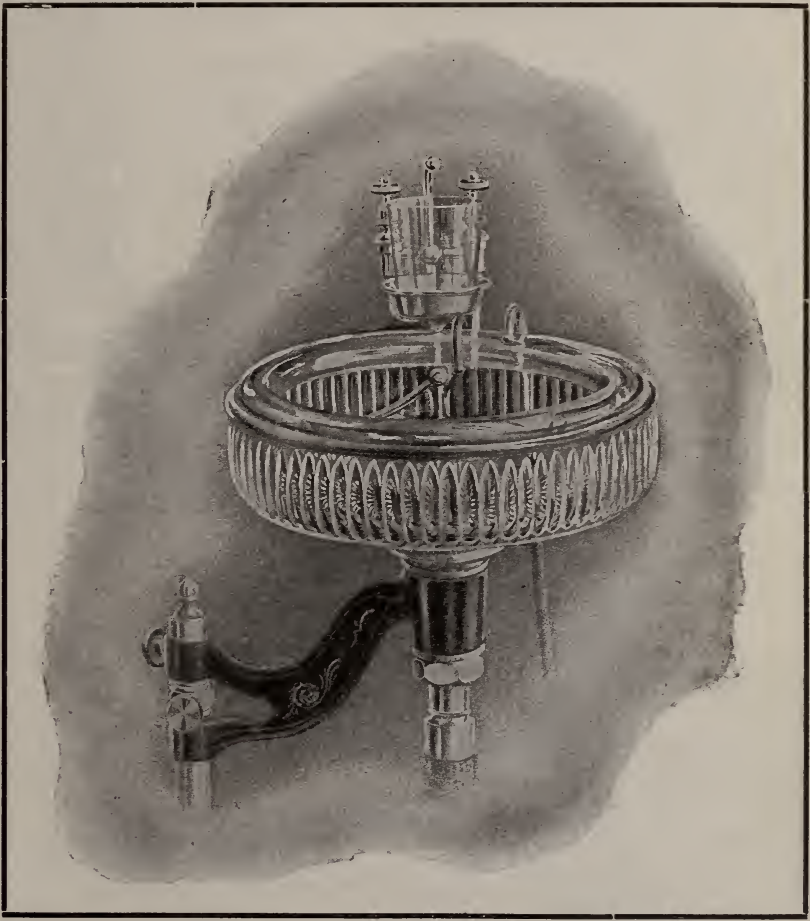
CENTRAL CHEMICAL CO
WELLSVILLE, N.Y., U.S.A.

For Sale by all Dental Dealers.

The
Weber Fountain Spittoon

The glass bowl you can't break. Valves that you never have to fix. Workmanship absolutely perfect. All flexible tubing covered with real silk. It can't ever back up or overflow. No machinery. Nothing revolves. Nothing to get out of order.

The only argument ever heard against it comes from a man who makes more money selling higher priced articles that show him more profit.



Look into it yourself. If the Weber isn't a better article, buy something else. Think about the price last, but don't forget it.

$40.00, Complete with Everything

SEND FOR DETAILED DESCRIPTION

Lee S. Smith & Son, *Sole Agents,* **Pittsburg**

VULCANIZER THERMOMETERS.

A Dental Vulcanizer Thermometer must be reliable to avoid danger of spoiled plates and possible disastrous results to the Vulcanizer itself.

THE BUFFALO DENTAL MANUFACTURING CO., PIONEERS IN THE MANUFACTURE OF VULCANIZERS

and accessories, offer a reliable thermometer which in quality of material employed and in the manner of its production and testing, leaves nothing to be desired. As a mark of distinction from Thermometers not so accurately made and tested, each tube bears our

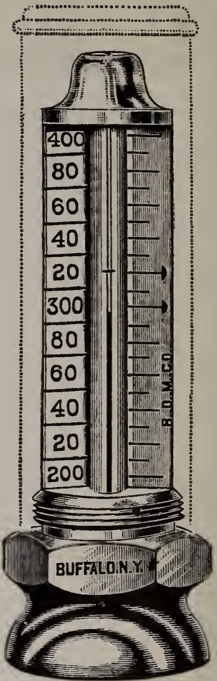
TRADE MARK,

A RED STRIPE IN THE WHITE GROUND.

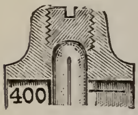
Ask your dealer for the "B. D. M. Co.'s Red Stripe Thermometer," and failing to obtain it send direct to us.

The illustration shows the thermometer tube and scale mounted in our improved Thermometer Case, in which provision is made for the correct adjustment of the thermometer tube to the indications on the scale. By turning the screw on the top of the inside thermometer case with a screw driver, the thermometer tube can be raised or lowered as required, till the black mark on the tube and the 320° mark on the scale coincide.

Tubes and Scales are sold together, and not separately, as each scale is specially adjusted to the tube accompanying it.



THERMOMETER AND CASE COMPLETE.



ADJUSTMENT FOR CAP.

PRICES.

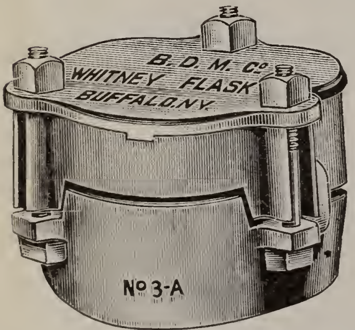
Thermometer Case, complete with tube and scale	$1.75
B. D. M. Co.'s Red Stripe Thermometer tube and scale	.50

By mail, postage paid on receipt of price.

NEW VULCANITE FLASK, FOR PARTIAL CASES.

No. 3A, WHITNEY FLASK.

MODIFICATION SUGGESTED BY DR. R. W. TAYLOR, CINCINNATI, O.



Made from No. 3 Whitney patterns, with an extension or lip on the front of bottom, which serves as a support for the plaster brought over the teeth in cases where six or eight anterior teeth are ground to the model, as in cases of immediate prosthesis; also to support the plaster teeth of partial lower cases where it is desired to "draw" the posterior teeth; also in many other partial cases where some teeth are to be "held" to the model and others "drawn."

It obviates the necessity of blind packing, and removes the danger of displacing teeth or breaking down plaster during the process of packing and closing the flask, which is the cause of so many malarticulations.

PRICES.

No. 3A, Whitney Flask, iron, each	$0.80
No. 3A, Whitney Flask, brass, each	1.25

The Buffalo Dental Manufacturing Co.,

Nos. 587 and 589 Main Street,

Send for Catalogue "C" of Vulcanizers.

BUFFALO, N. Y., U. S. A.

OPINIONS ABOUT OXPARA
WE HAVE MANY MORE

I am now ready to give you a testimonial. **OXPARA** has made the treatment of roots for teeth, with me, a science.

It deserves great success.

Yours truly,
CHAS. E. BENTLEY, Chicago, Ill.

The results I have obtained from the use of **OXPARA** are the best I have ever had.

It has done all you claim for it and I shall always use it in the treatment of dead and abscessed teeth.

Yours truly,
F. H. MOORE, Calais, Me.

In the treatment of putrescent pulps, even those of long standing, **OXPARA** is unexcelled. The most obstinate cases can be made aseptic in from one to three treatments. It has a permanent place in my office practice.

Yours very truly,
H. S. ROBINSON,
13 Horton's Block, Attleboro, Mass.

FREE!

To any dentist who has not tried OXPARA we will send gratis one sample only, providing request is written on his professional stationery, or his professional card is enclosed.

I have been using **OXPARA** for several months. It does wonders for me and I wonder how I ever got along without it.

I want to thank Dr. Dodez for his good work.

Yours very truly,
L. O. GREEN,
100 State St., Chicago, Ill.

Please send me one more box **OXPARA.** It is certainly the very best thing I have ever found for treatment of putrescent pulps. Would not be without it.

Have conquered some cases which have been under treatment for three or four years by old methods, and two to three treatments with **OXPARA** did the work.

Yours truly,
W. S. WALTERS, West Lafayette, Ind.

I have used your **OXPARA** with the best results, in foul roots that usually give us so much trouble.

Yours truly,
E. S. REED,
883-885 W. North Ave., Chicago, Ill.

I have used **OXPARA** and found it all right. It works to my entire satisfaction and unquestionably recommend it to all dentists.

Yours,
J. H. WOOLEY, Chicago, Ill.

I have used **OXPARA** for over one year and find it the best remedy for treating and filling diseased roots on the market.

You remember that it was some time before I would use it. I find it just as represented and would dislike to be without it.

Yours truly.
S. M. WHITE, Benton Harbor, Mich.

When used according to directions, have found **OXPARA** the most effective remedy yet presented to the dental profession for the treatment of all classes of devitalized pulps.

For permanent nerve canal fillings, consider it the best of all antiseptic fillings.

Respectfully,
B. T. OLCOTT, Keene, N. H.

BEWARE

Many preparations which are claimed will cure abscesses are being hurried upon the market to compete with OXPARA. Beware of them. They have not stood the test of time.

Have been using **OXPARA** for three months and can say that it is the best thing I have ever used. Will certainly do all that is claimed for it.

Yours very truly,
A. J. WILDANGER,
323 Saginaw St.,
Flint, Mich.

Please send me a box of **OXPARA** for filling canals. I enclose post-office order for $1.50.

I cannot get along without it. I think there is no preparation that can take its place.

Very truly yours,
J. E. WILTSON,
1002 Houston St., Fort Worth, Texas.

For the purpose for which it is designed, and it is a worthy one, to make a tooth, diseased and dead, become a good and useful member of the human frame, to this "**OXPARA**" does its perfect work.

Sincerely,
H. N. LANCASTER,
1221 Masonic Temple,
Chicago, Ill.

OXPARA CURES ABSCESSES

Oxpara is for sale by prominent depots. If your dealer will not supply you, order direct and write us his name

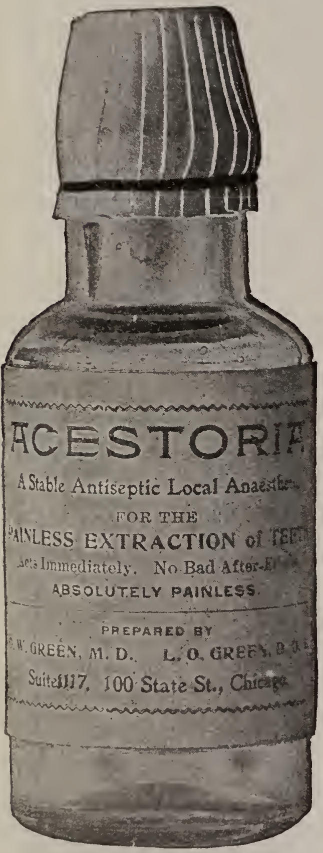
Price per Box, $1.50; Liquid or Powder, 75c.

The Ransom & Randolph Co.

Wholesale Agent ❧ ❧ ❧ Toledo, Ohio

ACESTORIA

The ONLY Local "antiseptic" anesthetic for the painless extraction of teeth, and all minor surgical operations


ACESTORI
A Stable Antiseptic Local Anaes
FOR THE
PAINLESS EXTRACTION of TEE
Acts Immediately. No Bad After-E
ABSOLUTELY PAINLESS.
PREPARED BY
W. GREEN, M. D. L. O. GREEN
Suite 1117, 100 State St., Chicago

EXACT SIZE TWO OUNCE BOTTLE.

Prices: 1 oz. 75c; 2 oz. $1.50.

NOTE.—ACESTORIA is used in the Chicago College of Dental Surgery.

ACESTORIA is used in the School of Dentistry, University of Illinois.

Elgin A. Ma Whinney's paper on Local Anaesthetics in the April number of the Dental Review, '02. Note in particular his remarks on **ACESTORIA**.

CONTAINING

THE ESSENTIAL OILS	ANTISEPTICS	ANAESTHETICS
Cajuputi, Cassiae,	Menthol,	Plantago maj,
Gaultheriae,	Phenol,	Hyoscyamus,
Caryophylli.	Glycerine.	Jam. Dogwood.

Nitroglycerin. Sufficient cocaine mur. is added to make a one per cent solution, which, in the presence of nitroglycerin. cannot produce any depressing or bad effects.

DEAR DOCTOR:—We desire to call your attention to the "antiseptic" qualities of the local anaesthetic **Acestoria.** A glance at the formula will satisfy you as regards antiseptic properties. To test its anaesthetic action we desire to have you use a sufficient quantity to prove, positively, its value and our claim of having produced the ideal local antiseptic anaesthetic.

A Few Well Known Professional Men Who Use and Commend Acestoria.

Dr. Elgin A. MaWhinney, President of the Chicago Dental Society and Professor of Materia Medica and Therapeutics, Northwestern University Dental School.

Geo. W. Cook, D. D. S., Ex-President Chicago Dental Society and Professor of Pathology and Bacteriology, Illinois University Dental School.

James Harrison Prothero, D. D. S., President Chicago Dental Laboratory Co., Professor of Prosthetic Technics, Prosthetic Dentistry and Metallurgy and Supt. of Infirmary, Northwestern University Dental School.

D. M. Cattell, D. D. S., Prof. Operative Technics and Operative Dentistry, University of Illinois Dental School, Chicago.

Geo. N. West, D. D. S., formerly Adjunct Professor Materia Medica and Therapeutics, Chicago College Dental Surgery.

Dr. James E. Keefe, Pres. Chicago Post Graduate Dental College, Chicago.

J. N. McDowell, D. D. S., Professor of Orthodontic University of Illinois Dental School, Chicago.

Dr. Robert P. Donaldson, Supt. University of Illinois Dental School, Chicago.

G. Walter Dittmar, D. D. S., Associate Prof. of Operative Technics, Superintendent Infirmary, Illinois University Dental School.

Dr. Chas. E. Bentley, Prof. Oral Pathology and Surgery, Harvey Medical College, Chicago.

Dr. L. S. Tenney, Ex-President of Odontographic Dental Society and Associate Prof. of Operative Dentistry, Chicago College Dental Surgery.

Hart J. Goslee, D. D. S., Prof. of Prosthetic Dentistry and Crown and Bridge Work, Chicago College of Dental Surgery.

Dr. F. H. Zinn. Sec. Odontographic Dental Society, Chicago.

Dr. Roll. B. B. Tuller, Clinical Prof. Operative Dentistry, Chicago College of Dental Surgery.

Harry P. Carlton, D. D. S., San Francisco, California.

W. O. Barrett, D. D. S., Browns Valley, Minn.

F. H. Leland, D. D. S., St. Johns, Mich.

Geo. B. Perry, D. M. D., Chicago.
F. H. Skinner, D. D. S, Chicago.
John B. Palmer, D D. S., Chicago.
A. G. Johnson, D. D. S., Chicago
Edw. S. Wingren, D. D. S., Chicago.
A. V. Hargett, D. D S., Chicago.
A. F. James, D. D. S., Chicago.
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H. G. Fischer, D. D. S., Chicago.
J. W. Birkland, D. D. S., Chicago.
C. N. Booth, D. D. S., Cedar Rapids, Iowa.
F. W. Booth, D. D. S., Coggon, Iowa.
J. M. Booth, D. D. S., Marion, Iowa.
J. J. Booth, D. D. S, Marion, Iowa.
L. H. Armstrong, D. D. S., Ottumwa, Iowa.
James N. Armstrong, D. D. S, Ottumwa, Iowa.
Daniel J. Brown, D. D. S., Ottumwa, Iowa.

A Few Well Known Professional Men Who Use and Commend Acestoria:

Dr G. H. Frey, Higginsville, Mo.
Dr. C. Deichmiller, San Francisco, Cal.
Dr. R. E. Morris, Kansas City, Mo.
Dr. Lew F. Miller, Berlin, Pa.
Dr. C. E. Werner, Republic, Ohio.
Dr. R. E. Smith, Sacramento, Cal.
Dr. W. G. Devore, Tompe, Arizona.
Dr. W. H. Caradine, Monroe, Wis.
Dr. T. A. Upham, Nashua, N. H.
Dr. D. L. Frazee, Plymouth, Ill.
Dr. E. E. Miller, Geary, Oklahoma.

PHYSICIANS AND DENTISTS:

Chas. P. Pruyn, M. D., D. D. S., Chicago.
Geo. W. Haskins, M. D., D. D. S., Chicago.
I. A. Freeman, M. D., D. D. S., Chicago.
Fidelio F. Brown, M. D., D. D. S., Chicago.
H. P. Wadsworth, M. D., D. D. S., Chicago.
R. C. Brophy, M. D., D. D. S., Chicago.
S. H. Arthur, M. D., D. D, S., Scranton, Iowa.

PHYSICIANS:

H. W. Roberts, M. D., Ottumwa, Iowa.
J. C. Bonham, M. D., Ottumwa, Iowa.
J. Wooley, M. D., Chicago.
H. B. Gwinn, M. D., Chicago.
T. F. Keyes, M. D., Chicago.
F. E. Simpson, M. D., Chicago.
A. G. Hearther, M. D., Chicago.
J. A. S. Howell, M. D., Chicago.
F. F. Feaster, M. D., Sheer, W. Va.
J. R. Boynton, M. D., Surgeon, Clifton Springs Sanitarium Co., New York.
H. C. Macy, M. D., Surgeon, Operates in Chicago Hospitals.

TESTIMONIALS.

Hailey, Ida., Jan. 19, 1901.
CHARLES S. ARCHER, Portland, Ore.

Dear Sirs:—I am using Acestoria right along and have got to find the first case where it failed. There are no bad after effects and the gums heal quicker than if I had not used it.

Yours very truly,
DR. H. D. JONES.

Portland, Ore., Jan. 23, 1901.
CHARLES S. ARCHER, Dental Supply House.

Dear Sir:—I have been using Acestoria in my practice for two years and a half and find it very satisfactory. Have had many extractions under it without any pain to the patient. I have tried many other local anæsthetics, but invariably go back to the old standby.

Yours very truly,
F. C. SELLWOOD, D. D. S.

To the Manufacturers of Acestoria:

Dear Sirs:—I have used Acestoria for the past four years and like it better than any local anæsthetic I have ever used; have had no sloughing or bad effects from its use.

Yours respectfully,
DR. E. A. MANN.

Pendleton, Ore., Jan. 22, 1901.
To the Manufacturers of Acestoria:

Dear Sirs:—I have been more or less familiar with Acestoria since 1896 and for the last four years have used it constantly. For a safe, serviceable, effective local anæsthetic, Acestoria is the best compound I know of.

Sincerely yours,
JEAN CLINE, D. D. S.

Portland, Ore., Jan. 23, 1901.
CHAS. S. ARCHER. Dental Supply House.

Dear Sirs:—I take great pleasure in recommending Acestoria as a local anæsthetic for the painless extraction of teeth. It leaves no bad effects and is superior in every way to anything of the kind I have ever used.

DR. T. L. PERKINS.

Fairhaven, Wash., Jan. 19, 1901.
MR. CHAS. S. ARCHER, Portland, Ore.

Dear Sir:—Please send me 10 ounces of Acestoria. I have tried nearly all kinds of local anæsthetics, but have discarded all for Acestoria. I could not get along without it.

Very respectfully,
O. F. SIMS, D. D. S.

ONE OUNCE, EXACT SIZE, 75c

MANUFACTURERS
O. W. GREEN, M. D.
L. O. GREEN, D. D. S.

Write to any of the above mentioned gentlemen and ask their opinion on the virtues of Acestoria.

If you cannot procure Acestoria from your dental depot, order direct from

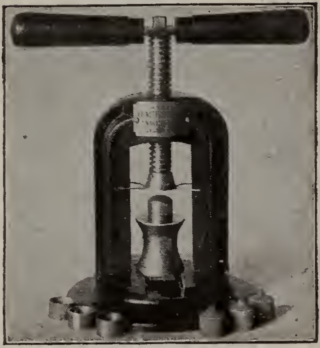
DR. L. O. GREEN,
100 STATE STREET CHICAGO, ILLINOIS

BREWSTER'S HIGH-

THE PORCELAIN IN USE BY THE LEADING PORCE

BREWSTER'S SWAGING PRESS.

DR. J. W. WASSALL, of Chicago, as is well known, is a strong advocate of the "Swaging Method" of making Porcelain Inlays and Restorations. Some time since he asked us to make a Press that would stand this work (those he had previously used readily broke down). The Press illustrated, has proved satisfactory in every way for Inlay work, and is sufficiently strong for swaging thick metal plates for Crowns, for Backing plate facings, or Diatoric Teeth for dummies. Thick metal may be swaged better by pressure than by hammer. The metal lies closer, is more perfectly adapted and has no tendency to spring out of place.



The steel cups are one inch in diameter, giving ample room for the largest matrices, etc.

The width between uprights of Press is 2 1-2 inches, and will, therefore, take a zinc Die and Counter Die up to that width. The Press Screw is made long to give ample vertical range.

Rubber bags containing water are used for swaging the Platina, or Gold matrices.

Solid rubbers made to fit cylinder are used for thick metal.

Clear directions for swaging—from taking the impression in cement to the completion of the Inlay—are sent with each complete outfit.

Price of the complete outfit is $10.00.

FOR SALE BY DENTAL DEPOTS EVERYWHERE.

SOLE MANUFACTURERS

THE BREWSTER DENTAL COMPANY,

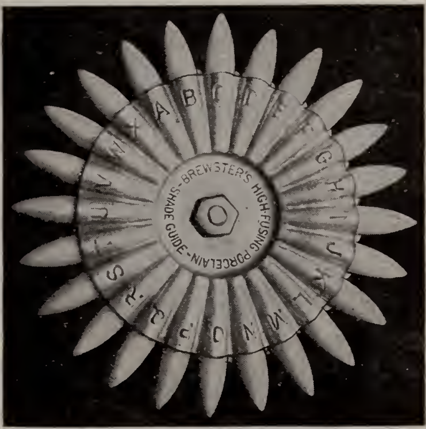
2544 Princeton Ave. CHICAGO, U. S. A.

FUSING PORCELAIN

-LAIN WORKERS IN THE U. S. AND CANADA

WHEN buying a Porcelain outfit it is well to buy one that has received the endorsement of porcelain experts throughout the country. IT WILL SAVE YOU MONEY AND DISAPPOINTMENT.

The "Enamel Body" (of which these points are composed) has been repeatedly tested on the Dynamometer and found to register the same resistance to fracture as the best porcelain teeth



BREWSTER'S NEW SHADE GUIDE forming part of his outfit of 27 bottles

Price
Complete
$12.50

Price of 15 bottle outfit including Shade Guide of 12 colors $10.00

For dealing with a large variety of shades, this Circular Guide is the most convenient form yet devised. It is light, compact, composed of nothing but aluminum and porcelain; may be thrown into the sterilizer and boiled. The shades are all in view at once, and by rotating opposite the teeth in the mouth, the correct shade is readily found. The points may be passed between the teeth.

HIGH=FUSING OIL COLORS, for use in Inlay Work, for changing the Color of Facings, Rubber Sets, etc.

Complete outfit, large size, $8.00
Complete outfit, small size, $5.50

See the December Dental Review for Mr. Brewster's paper on the use of Colors in Oil

FOR SALE BY DENTAL HOUSES AND BY THE MANUFACTURERS

The Brewster Dental Company 2544 Princeton Avenue
CHICAGO, ILLINOIS

The Justi Porcelain Teeth-

Are noted for their beautiful and graceful shapes. The shades are of a delicate blend of body and enamel and have that most desirable of all qualities-translucency. Do not accept substitutes.

If your dealer should not have them, write direct to us.

Philadelphia. Chicago.

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95

F 4

J 3

5

A A 5

C 7

Justi Porcelain Teeth

ARE NOTED FOR

Their beautiful and natural shapes

Their strength and density of body

Their color and translucency

Their adaptability

Their life-like appearance in the mouth

The accompanying cuts show a few of our most desirable molds.

...GIVE THEM A TRIAL...

Sold by all leading Dental Depots throughout the world.

H. D. Justi & Son

PHILADELPHIA
CHICAGO

THIS IS THE

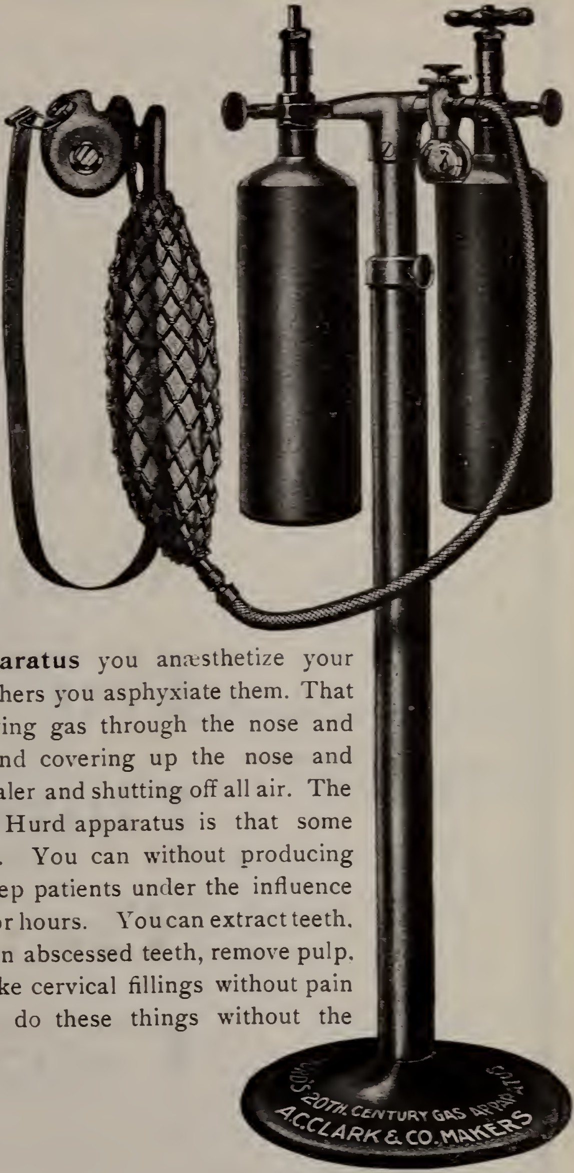
CLARK SPITTOON

It is everything that is good in a spittoon and *it won't back up; it won't overflow; it won't make any noise.* If you are told that about *any other* ask the man that uses one. That is all.

FOR SALE BY THE BEST DENTAL DEPOTS ALL OVER THE WORLD.

A. C. CLARK & COMPANY
MAKERS OF GOOD DENTAL GOODS.
CHICAGO, ILL., U. S. A.

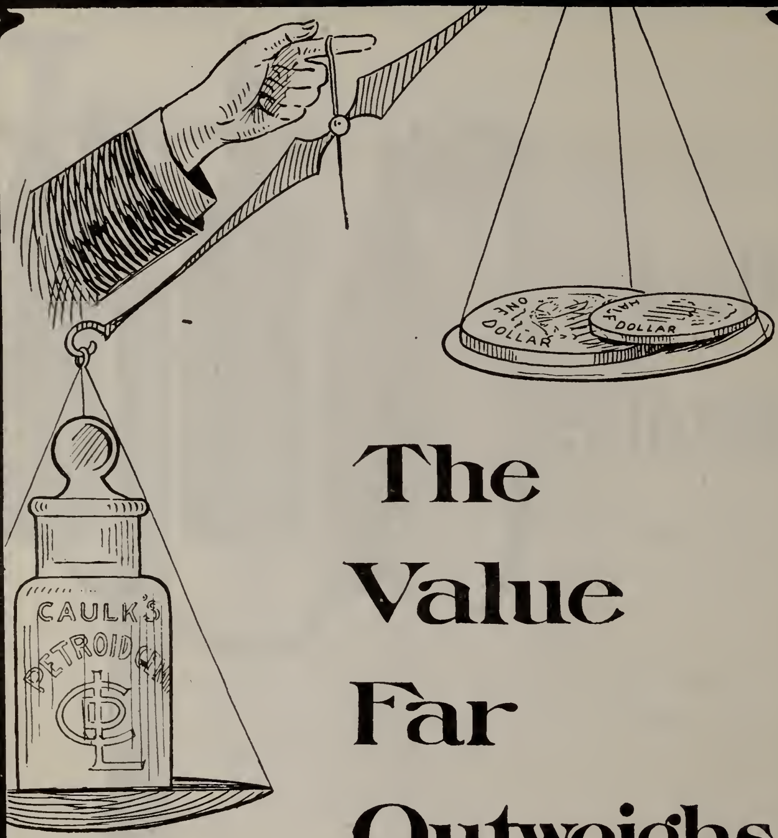
Hurd Apparatus



With the **Hurd gas apparatus** you anæsthetize your patients; with most of the others you asphyxiate them. That is the difference between giving gas through the nose and letting the patient have air and covering up the nose and mouth with the old style inhaler and shutting off all air. The only strange thing about the Hurd apparatus is that some one didn't think of it before. You can without producing nausea or without danger keep patients under the influence of nitrous-oxide for minutes or hours. You can extract teeth, remove old fillings, operate on abscessed teeth, remove pulp, nerves, sensitive dentine, make cervical fillings without pain and loss of time. Can you do these things without the Hurd apparatus?

To responsible parties we sometimes put them out on approval, through your dealer. Write us concerning an arrangement of this kind.

A. C. Clark & Co. Makers Chicago, U. S. A.



The
Value
Far
Outweighs
The
Cost

**SOLD
NEARLY
EVERYWHERE**

MADE BY
L. D. CAULK
PHILADELPHIA
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IF YOU ARE A USER YOU KNOW NOT LET US PROVE THE VALUE

TO YOU IN YOUR PRACTICE OF THE

PAYNTER-WATSON ELECTRIC DENTAL AND DIAGNOSTIC LAMP

Patented March 11, 1902.

Is different in principle from all other Dental Lamps and has proved to be the best.

Send for Catalogue Number 2 which fully explains Dental Lamp equipments to meet **most** conditions and requirements.

Pat. applied for.

For any Voltage Direct or Alternating Current

The Watson Electric Water Heater should be in every Dental Office where current is available. Placed in a glass of water will in a few minutes heat to proper temperature for syringing purposes.

The Price, $3.00, places it within the reach of all.

Each heater furnished complete, with spring clip to hold against side of glass, six feet of flexible wires and attaching plug.

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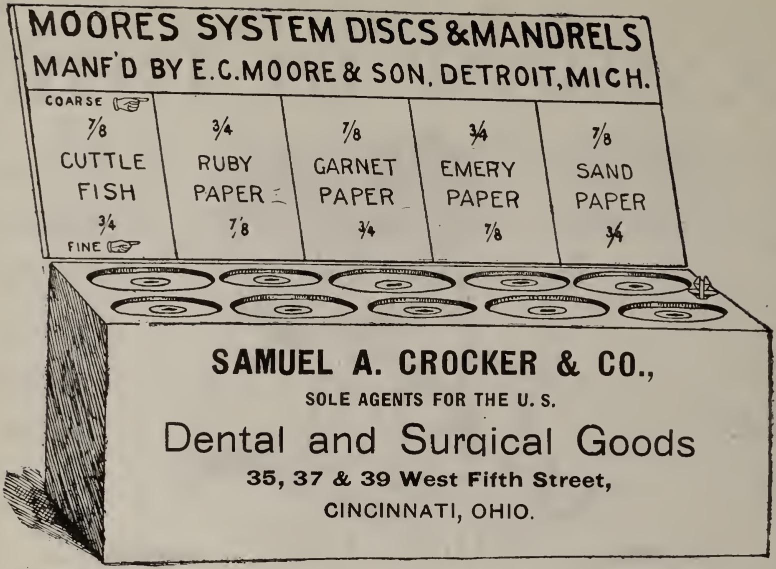

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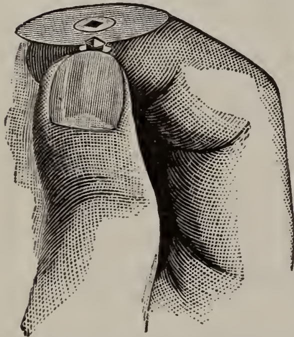

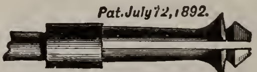
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As shown in the illustration, the efficiency of both the disc and mandrel, owing to their mechanical construction, is so apparent and satisfying, that special instruction is scarcely necessary. It is comforting to know that the mandrel is but one piece, no screws or nuts to drop or lose on the floor; it can be turned backward as well as forward without fear of disc coming off. The illustration shows the construction of mandrel, which is simply a split mandrel having a square grooved beveled head, and the disc, which is supplied with square metallic center, is put on and held tightly to place on the mandrel by pressing smartly into the square center of disc until it goes on with a snap, and to remove, take mandrel between the thumb and finger in such manner as to tend to close the spring of the mandrel, insert the thumb nail between the flange of the mandrel and the flange on the disc, forcing the nail between, throws the disc off; a very little practice and this is easily done.

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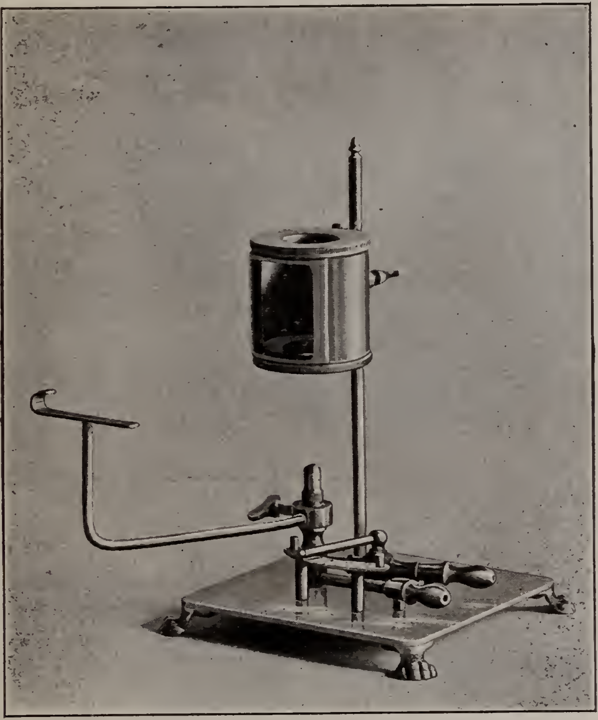

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Let us send you instructions in the manipulation of Dr. Jenkins' Porcelain Enamel and some fused specimens showing some of the colors we manufacture. We guarantee Porcelain Enamel, the strongest and densest dental Porcelain known, and that its colors will not fade or change in the mouth.

Dr. Jenkins' Porcelain Enamel is for sale by H. D. Justi & Son and all first-class dealers in dental supplies throughout the country.

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Gilbert's Temporary Stopping

is not only the original preparation for the purpose, but is beyond question **THE BEST.** During the twenty-three years in which it has been **The Standard of the World** *it has been imitated by many, but its equal has never been produced.* It has always **Stood Exclusively on Merit,** the cheaper imitations have been "*tried and found wanting,*" and never in the history of dental preparations has the theory "*the survival of the fittest*" been more forcefully exemplified.

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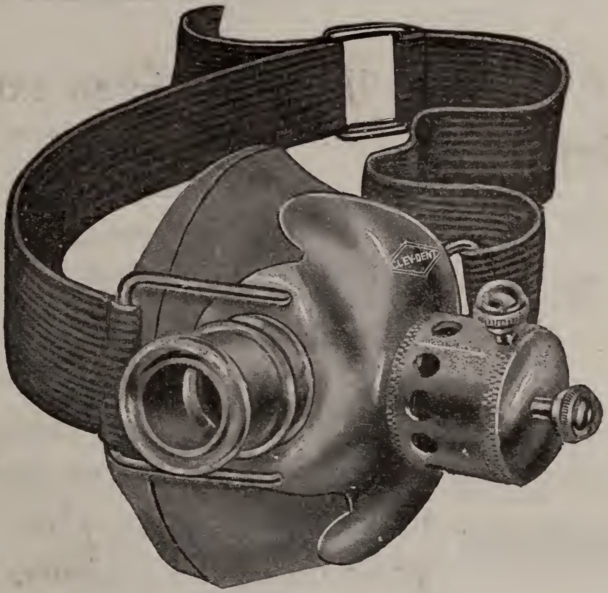

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Drill a cavity in an extracted tooth. Use general retention, but so little that you would be strongly tempted to believe it impossible to start. Start it with **de Trey's Gold,** after having annealed it properly; then try to do the same thing with your favorite gold, no matter what it may be. Draw your own conclusions. This experiment will prove that there is no gold that will adapt itself to the tooth as perfectly as de Trey's Gold. The possibilities of rocking are removed.

When working de Trey's Gold cut it with scissors on a thin sheet of mica, in pieces having about the size of the cavity. Anneal eight to ten pieces at a time. Anneal above an alcohol flame until you can notice a change in the color of the gold. It gets slightly darker. When sufficiently annealed, REMOVE from the heat. With a thin sheet of mica this takes about ten seconds. Allow the point of the flame to touch the mica. Always cover the entire bottom of the cavity with the gold, pushing it down gradually with as large a plugger as the cavity will allow. Then condense with a smaller plugger.

For further information address

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THE

DENTAL REVIEW.

VOL. XVII. CHICAGO, SEPTEMBER 15, 1903. No. 9

ORIGINAL COMMUNICATIONS.

ELECTRICITY IN THE DENTAL OFFICE.*

By Ashley M. Hewett, D.D.S., Chicago, Ill.

Mr. President, Ladies and Gentlemen of the Chicago Dental Society.

It is our idea to present to-night some practical thoughts upon the subject of electricity in the dental office, and as electricity in the dental office is not unlike electricity out of the dental office, perhaps this paper might better have been called just plain "Electricity."

If there is one thing above another which will cause a dentist to leave his home and attend a dental society it is the practical demonstration of an idea. We are therefore not going to start arguments regarding the theory of infinitesimal vibrations, nor are we going to burden you with a lot of definitions, but rather to try to state, in a brief and concise manner some facts backed as far as possible by simple experiments which we will attempt to make.

The subject of electricity is so vast compared with anything I am able to write about it, that I am merely like the green grass which covers Mother Earth. By reading this paper I simply form a green background for the flowers which will bloom in the discussion, later.

So like the German who wanted to cut off his dog's tail, took off an inch a day so that it would not hurt so much, we will now take off the first inch.

What is electricity? Where does it come from? What is that mysterious force which creeps into our offices and homes, so silently, on such small wires, but with such magnificent power? These are the questions we hear on every hand, but not yet fully answered by our men of science.

---

*Read before the Chicago Dental Society, April, 1903.

It perhaps might be of interest to some in answering the question, "Where does it come from"? to glance briefly at the simplest theory of a dynamo, which is the passing of a wire through a magnetic field, a current being induced in the wire, caused by the "cutting" of the lines of force or magnetism.

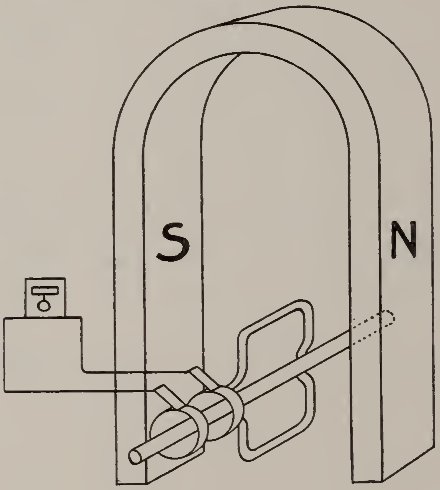
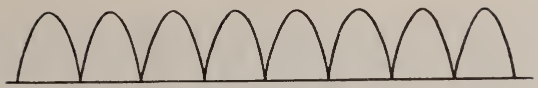


Fig 1.

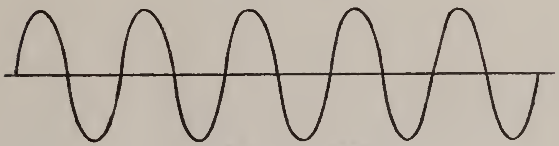
Between the ends of a horse-shoe magnet, "north" and "south" are supposed lines of force or magnetism. By turning the rod or armature to the right, the top approaches the pole "north" and passing through the lines of force or magnetism, cuts them and the current is collected by the brushes on the wheel and is felt on the line. Then we can understand how by approaching and drawing away from the ends of the magnet by the armature, will generate current.

There are two general kinds of current, the alternating and the direct.

The difference between alternating and direct current is shown by Fig. 1A.



Direct Current.



Alternating Current.

Fig. 1A.

Direct current may be defined as a great many positive pulsations given off by the coils in the armature of a dynamo, collected by the brushes and sent off on the positive wire then returning on the negative: these pulsations are given off in such rapid succession as to make practically a constant or direct current.

Alternating current is also a great number of pulsations, but instead of being all in one direction they are alternately positive and negative as many times per minute as the product of the number of field coils and the revolutions of the dynamo.

CYCLES.

The term cycle which puzzles so many is merely two alternations, one positive and one negative. Cycles are figured per second and alternations per minute. Thus an alternating current of 16,000 alternations per minute divided by 2 equals 8,000 cycles per minute, and then divide by 60 equals 133 cycles per second, or as commonly called, 125 cycles, or "a 125-cycle motor."

The number of cycles depend upon the number of alternations coming from the dynamo.

ALTERNATING CURRENT.

A few years ago, a man who had sufficient courage to ask his dental dealer about a motor or any electric appliance for alternating current was looked upon with an expression of pity and regarded with suspicion for his mental soundness, but let me assure you, gentlemen, alternating current is here to stay. It is a significant fact that Niagara Falls are used to produce alternating current. Why? Because alternating current can be transmitted 40 miles from the dynamo and still retain its strength intact. This being done by generating the current at the station at a pressure of from 1,000 to 15,000 volts and sending it out on the line and then cutting it down by means of a transformer.

DIRECT CURRENT.

This has certain advantages and is mostly to be found in private plants, and in the congested portion of cities where circuits are comparatively short from dynamo to where the power is to be used.

To-night we are going to talk about some of the habits and laws which govern the successful handling of the street current such as the dentist finds it in his office. Pardon me, then, if I am rudimentary for a few minutes, that we may all have a clear understanding of current and pressure. Perhaps the simplest way to illustrate this would be to procure a force pump, some pipe and force the water around in the pipe. (See Fig. 2.)

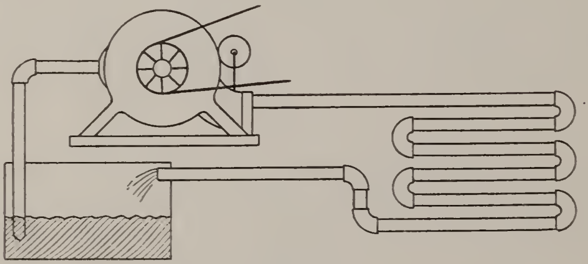


Fig. 2.

This will give us an idea of current and pressure. This current and pressure is measured in a manner peculiar to itself, but not unlike gas or water is measured. Therefore in measuring currents of no matter what variety, we do so the same as we measure a given amount of money in so many dollars or units.

To refresh our minds let us remember that:

Potential expressed in Volts = Pressure.
Electric motive force expressed in Volts = Pressure.
Resistance expressed in Ohms = Resistance in wire or material used.
Quantity of electricity expressed in Amperes = Flow or amount of current.

Fig. 3.

The unit employed in the measurement of electromotive force is called a volt, from the name Volta.

The law that is used to determine the strength of a current is called Ohms law, named after that great German scientist who first gave to the world the principle by which the strength of all currents may be measured, or ascertained.

Without a clear understanding of Dr. Ohm's law it is useless to try to study electricity. Therefore let us again refresh our minds upon this subject. Here is the whole thing in a nutshell:

$$C = \frac{E}{R} \qquad \text{CURRENT} = \frac{\text{ELECTROMOTIVE FORCE}}{\text{RESISTANCE}}$$

AMPERES EQUAL VOLTS DIVIDED BY OHMS.

Fig. 4.

This means, according to Dr. Ohm, "that the strength of the current is equal to the electro motive force of the battery or dynamo divided by the resistance offered to the circuit."

Let us get this clearly in our minds. (See Fig. 5.)

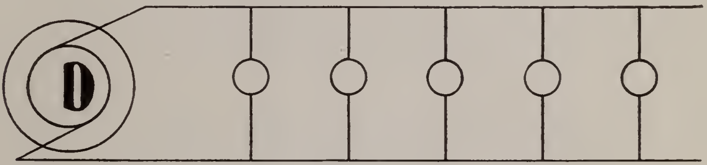


Fig. 5.

About the year 1832 a noted scientist of the name of Ampere discovered, or rather, formulated a theory which shows us how electricity and magnetism are relatives. He gave us the connecting link. By Amperes we mean the flow of current.

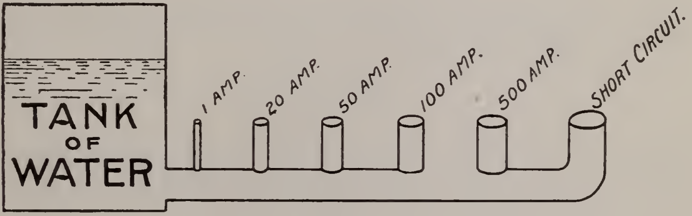


Fig. 6.

Now that we have the idea of the current in the wire and the pressure thereon, its measurement and something about the relationship of ohms, amperes and volts, we want also to remember that there are other forces which must be taken into account, than the current which runs through the wire. In other words,

COUNTER ELECTRO MOTIVE FORCE.

This is by no means a factor to be overlooked in the arranging of the wires on alternating currents of any windings for any purpose, whether it be a transformer, a choke coil, a rheostat or an electric furnace or other places where electric windings are used. To illustrate:

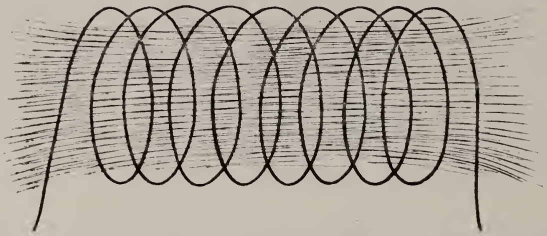


FIG. 7—LINES OF FORCE OR MAGNATISM.

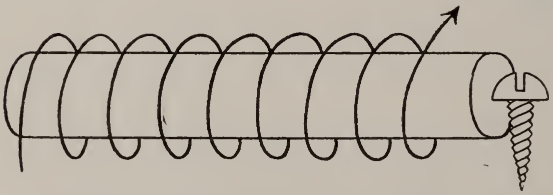


FIG. 8—HOW TO MAKE AN ELECTRO MAGNET.

It may be of interest to note that the electro magnet was discovered by William Sturgeon in 1825.

EXPERIMENT.

Take a bar of soft iron and wrap a piece of insulated wire around it. Then pass a current through the wire and you will have an electro magnet. The soft iron will become magnetized by the effects of the lines of force, the iron forming an easy path.

Do not get the lines of force mixed with the idea of the current.

The first law of currents as given by Prof. Alfred P. Gage of Boston is that, "parallel currents in the same direction attract one another—parallel currents in opposite directions repel one another." To illustrate:

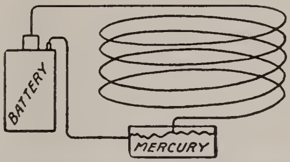


Fig 9—Making and Breaking the Circuit.

Make a spiral coil of wire and pass a current through it. The little glass below contains mercury, and the wire is separated and the two ends put into the mercury. We then turn on the current, and the lines of force will become apparent, sufficient to cause the coils to contract, and raise the end of the wire out of the mercury.

This is to illustrate that the lines of force try to run parallel to each other, which fact has been established since 1825. We will say something of their destructive effects later.

Now what can be done to counteract these forces of magnetism or lines of force so powerful? For answer we must go back to the first law of currents. "Parallel currents in opposite directions repel one another," according to Prof. Gage. Let us see if they do.

In Fig. 7 we had a single winding of wire from left to right continuously in one direction.

On this coil (see Fig. 10) we have wound two wires, one wound to the right and one to the left, running in opposite directions to each other.

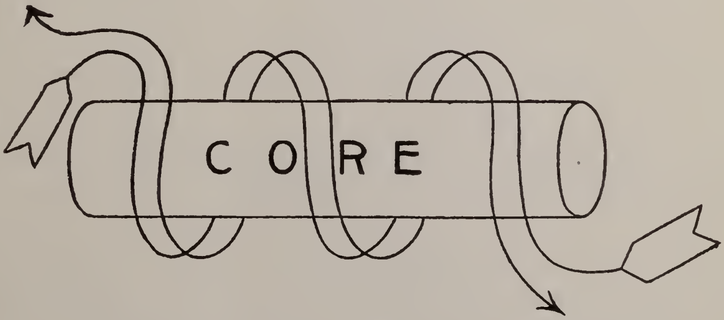


Fig. 10.

By passing the current through one wire from left to right, and another current on the opposite wire from right to left. One current equalizes the magnetic effects of the other. According to theory the lines of force given off from one-half of the coil are counteracted by the lines of force given off by the other half.

What may be learned from all this? That any coil of wire wound continuously in one direction and an alternating current allowed to pass through it, there will be a magnetic influence developed in almost astonishing quantities.

You have doubtless wondered what made your furnace "burn out" when you had a continuous winding of platinum wire in one direction. We will tell you. In a continuous winding (see Fig. 7) in a furnace you have exactly the same effects as we had in the coil. Whenever the current passes through the coil and you put a pair of pliers or metallic instrument of any kind in the furnace you simply make an electro magnet of it and this causes vibration. When the wire is at an intense heat necessary to fuse our high fusing bodies (2500 deg. Fahr.), the vibration of the wire caused by magnetic influence tends to disintegrate the molecules of the platinum wire.

It stands to reason that shaking the wire of a furnace, no matter how slightly when it is at an intense heat will cause it to vibrate, "degenerate," change form, and in a short time break.

Many may have wondered why it was that our splendid electrician Dr. Custer of Dayton, Ohio, wound his furnace in a "zigzag" manner

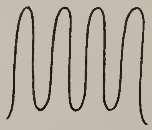


Fig. 11.

This is the reason, to overcome the lines of force, as he certainly recognized the value of that principle.

ELECTRIC HEAT.

Let me say that the heat generated by electricity, stands today as it has always stood inimitable and unapproachable for first class porcelain work, because it is as pure as the sun light, no smell, no smoke, no gas, no carbon, just plain nascent, virgin heat, and nothing else and it is yours all you want of it for the trouble of "pressing the button."

THE IDEAL ELECTRIC FURNACE.

Now we are going to tell you how we think the ideal electric dental furnace should be made.

First. It must be wound in some manner to do away with magnetic influences, especially when used on alternating currents.

Second. The ideal furnace must have a muffle large enough to hold any work the dentist may see fit to place therein from an inlay to a bridge. These little muffles as large as a dime do not please the dentist who has porcelain work to do.

There are two general principles upon which electric furnaces are wound. Those wound inside the muffle and covered with cement or clay and those wound outside of the muffle in grooves. While it is true that the wires imbedded in the cement are closer to the work and may possibly heat up a trifle quicker, yet they have this disadvantage that the cement will chip off very easily and leave the wires exposed. Then if the pliers or anything metallic touches them a short circuit is immediately formed and the wire "burns out" or should any metal be spilled in the furnace it is very likely to come in contact with the wires and cause short circuits.

To illustrate a short circuit. (See Fig. 12.)

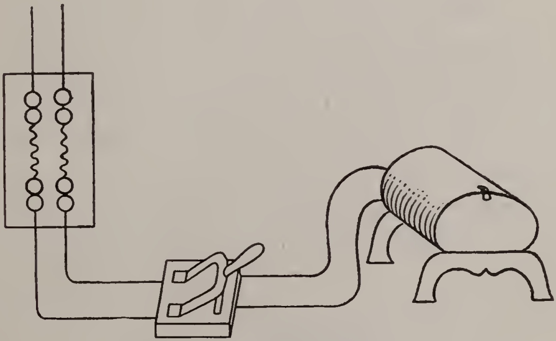
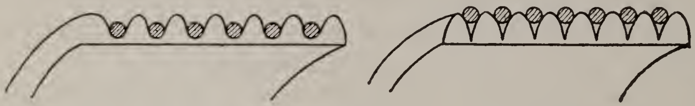


Fig. 12.

(If anything metallic is brought in contact with both poles at any point a short circuit is immediately formed.)

We are, therefore, in favor of the thin scientifically made muffle, first, last and always, because it protects the wires from short circuits. There is no danger of placing anything in the furnace of a metallic nature, the pliers may be used with perfect safety or any metal may be used or layed on the bottom of the furnace without danger of short circuiting. We wish to go on record as being in favor of a substantial muffle. It is needless to say that the muffle should be thin but consistent with strength and that the grooves should be made rounding in the bottom so that the wire rests in the bottom of the groove, allowing no air space between the wire and the muffle. (Fig. 13.)



CORRECT. FIG. 13. INCORRECT.

Third. In all mechanically constructed appliances every part must be interchangeable, and adjustable for repairs. This principle is recognized among mechanical engineers. Therefore any furnace in which the wire cannot be taken out and repaired or adjusted does not conform to the above mechanical principle.

It is a serious reflection upon the dentist's intelligence to think that every time a wire breaks in his furnace he must send it to New York for repairs together with $18.00.

Fourth. The ideal furnace must have a door which closes tightly and which will thoroughly confine the heat given off by the platinum wire. When I was a boy on the farm, and it became necessary to warm a room we always closed the door, so that the air in the room might become equally heated and confined. How some men can expect to bake high fusing porcelain in a furnace without a door, and still hope for the best results is more than I can comprehend.

We must remember that confining the heat in a furnace is just as necessary as the ability to produce or manufacture a sufficient amount of heat.

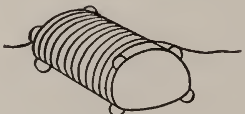


Fig. 14.

Experiment.—Confine the heat of an ordinary incandescent light and you can boil water with it.

Wrap a coil of wire around a muffle and turn on the current and do not confine the heat, as shown in Fig. 14. The wire will become hot but never reach the high heat necessary to fuse porcelain if not placed in something which would confine the heat. Thus we have an example of heat radiation.

While on the subject of heat radiation, it is an interesting and significant fact, that in one of our great electric power houses in this city which contains 20 boilers for steam making purposes, during the warm weather of summer, 10 boilers furnish enough steam for a given amount of power, while in the extreme cold weather of winter, 15 boilers are necessary at full capacity to perform the same service.

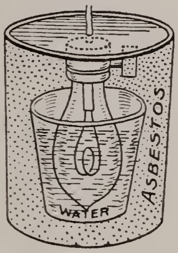


Fig. 14A.

Have you noticed any difference in your furnace in the time required in baking? That it takes longer to fuse a bridge than an inlay? The temperature of the room plays an important part in the baking qualities of a furnace.

Fifth, The Ideal furnace has no rheostat, every bit of energy developed by the current and paid for by the dentist should go toward making heat instead of being shunted off in a clumsy rheostat. Crowns, bridges, and inlays are just as successfully baked without a rheostat as with one.

A furnace with a rheostat gets no hotter than one without. The degree of heat which any electric furnace may attain is governed by the fusing point of platinum wire, about 3650 deg. Fahr.

A rheostat only helps the furnace to get hot a little quicker. Did it ever occur to you that when you are using a furnace in connection with a rheostat you are practically using two furnaces? Yet with these facts before us, there are expert and clever men who use and consider the rheostat indispensable.

The furnaces now made and on the market which have rheostats usually have about 6 feet of platinum wire, while the furnace which connects indirectly on the main line has over twice as much or about 13 feet of wire.

The advantage the furnace which connects on the main line direct has, is this, there is twice as much radiating surface of platinum wire. Please note this fact.*

Sixth. The ideal furnace must be wound with a large platinum wire—large enough to be strong. Small wires "kink" easily and where the "kinks" are, there is where it is usually the weakest and burns out first. It takes a wire of sufficient size and length to get proper radiation and it is logical to suppose that if a gun is to shoot properly we must use enough powder to do the work. It is just so with a furnace. If we expect to have enough heat generated we must use enough platinum wire to do the work properly. Therefore it is not at all surprising that the furnace with the small short wire burns out readily.

Seventh. The ideal furnace must have a peep hole which may be closed and opened at will. When the peep hole is opened it should allow the eye to see into the furnace unobstructed by mica or anything else. The eye should rest on the porcelain itself. When through looking at the work the peep hole should close automatically, so that no more heat will escape than necessary.

CURRENT VARIATION.

We have all read and heard a great deal about the variation of the street currents. A man at Halsted and Madison streets bakes with his rheostat on the first button, and another at Western avenue, bakes with his wide open, or on the fourth button.

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*RHEOSTATS.

If we are to have rheostats we must have the very best built upon scientific principles. In schools and laboratories—where the furnace is kept continually heated. It is different from where it is heated once a week.

The same mechanical principle of which we spoke awhile ago must be applied to rheostats as well as furnaces—as in all mechanically constructed appliances every part must be interchangeable and adjustable for repairs.

The best rheostats are those built upon the unit system of resistence, the wires imbedded in porcelain, by a patent process, each resistance "stick" represents a given amount of resistence. And down through the years when a certain "stick" has become distintegrated through constant use, it is readily repaired by placing in a new "stick." This is an advantage which can not well be overlooked.

The best rheostats have as many as nine buttons, allowing any of the nine different degrees of heat in the furnace.

Another man bakes a piece of porcelain at 3 o'clock in the afternoon in ten minutes, and at 7 o'clock the same evening, with the same furnace it takes him anywhere from two to five minutes longer to do the same amount of work. What does all this mean? Do street currents vary? If so, how much? Yes; street currents do vary.

If electricity could be made and stored as easily as the gas company can make and store gas, to keep the pressure uniform would be comparatively easy. But the electric current must be manufactured as it is used. The dynamo must be kept running. For example, at 4 o'clock in the afternoon there are comparatively few lights burning, at 7 o'clock there may be 40.000. It is a common thing in any theatre to have in one minute 500 lights burning full pressure and the next have them turned off completely.

Could we stand in a central station power plant and watch the arm of a volt meter in its backward and forward movements we could then and only then appreciate that there is variation in the street current. We have procured through the kindness of a friend the reading of a central station volt meter, and the average reading was as follows:

Maximum during day 122 volts.
Minimum 100 volts.
Average 111 volts.

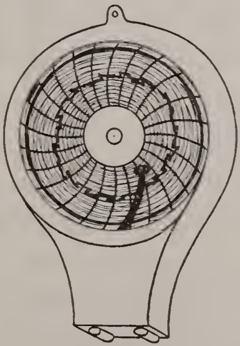

Fig. 15.

HOW TO SPLICE A PLATINUM WIRE IN A FURNACE.

Take one end of wire in right hand and the other in the left. Cross them, wind the end from right hand around the wire in left hand, and then wind the end on left hand wire around the wire in right hand. Trim the ends down closely. This forms a joint that will not arc or burn out or lap over on the adjoining wire.

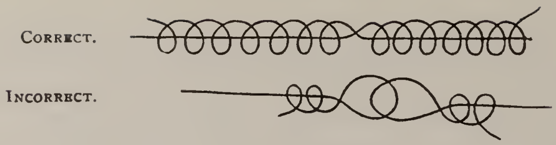

Fig. 16.

Never wind a wire too tightly around a muffle after repairing it, as the uneven expansion of clay and wire may break the wire—although the wire should always be tight enough to keep it in place nicely.

MOISTURE IN FURNACE CLAY.

Tests made show that the ordinary clay muffle and cover are capable of absorbing anywhere from one to two and one-half ounces of water, and will readily absorb moisture from the air especially in damp weather. It is, therefore, always advisable when starting up a furnace to take a little time in drying out the muffle.

Do so very thoroughly before gradually pushing the rheostat forward at intervals of 2 or 3 minutes each. It would be easier on the furnace if the intervals were 5 minutes apart.

That "fast man" who insists on pushing the rheostat up to the last button the first thing, deserves to have his furnace "burn out." And those of us who do not bake an inlay every two minutes during the entire day can well afford to spend a short time to bring up the heat gradually. Another point; it is just as hard on a furnace to cool a muffle quickly as it is to heat it too quickly. Therefore, after a case is baked, place the handle of the rheostat on the first button for a few minutes and allow the heat to gradually die away.

GOLD ANNEALERS.

There are several electric gold annealers on the market. We believe that Dr. Custer's is the most scientifically constructed. The wooden edge around the outside is a distinct advantage, allowing the little finger to rest upon it while picking up gold. The rough surface is also desirable. The only criticism we have to offer is that it ought to be made a little easier of repair. Dr. Black says, "Time is an element in annealing gold." Personally, I never used any gold that was thoroughly annealed until I owned a Custer annealer.

ELECTRIC ROOT CANAL DRYER.

Those who are called upon to remove a gutta percha root canal filling from an extremely inflamed tooth, and wish to do so in about 2 to 5 minutes without pain to the patient, will find a small root canal dryer heated by electricity a most efficient and indispensable helper. Electrically heated hot air is the best for root canal drying, because one is not so apt to burn the tooth as with the root canal dryer.

SMALL MOUTH LAMPS,

which are now made to connect directly on the main line, are very satisfactory and convenient assistants in detecting pulpless teeth. Attention is called to a very ingenious electric light invented by Dr. Laird W. Nevius of Chicago. The light is worn on the forehead of the operator which enables him to keep the light continually parallel with the vision and into the patient's mouth. This is a distinct advantage when artificial light must be resorted to.

A PLEA FOR THE ELECTRIC MOTOR.

The ordinary electric dental engine or motor makes 1,800 revolutions per minute—128,000 per hour; and if run continuously for ten hours it makes the enormous number of 1,280,000 revolutions.

Every electric engine should have a little sign on it, reading, "OIL ME OFTEN."

USEFUL APPLIANCES FOR ANY DENTAL FURNACE.

Among the new appliances for any electric furnace we want to call attention to the following:

*Attention is called to this ingenious little appliance suggested by my friend Dr. A. E. Matteson of Chicago, and especially adopted to beginners in porcelain work, for ascertaining the temperature of the heated furnace. It consists of a piece of clay with a "dumb bell" shaped hole in it. A piece of pure gold is placed in the upper end of the "dumb bell" and when the furnace attains a heat of 2016 degs. Fahr. (melting point of gold) it runs down into the lower end of the hole.

By turning over the clay (like turning over an hour glass), when again heated the metal runs back. A little borax placed in the ditch will assist the metal in running backward and forward.

The advantage this material has is that it is practically indestructible by fire, and is the best material that has ever been used for the purpose. All these utensils are serrated on the bottom so that they scarcely ever stick to the muffle of the furnace, and should they do so an instrument may be easily placed under the edge and carefully tilted upward until it becomes loosened.

THE AUTOMATIC ELECTRIC BUNSEN BURNER,

for the dental tray is an exceedingly useful little helper. Connected to the gas pipe, by metal tubing there is no odor of gas in the office and operating room, as there usually is where a rubber tubing is used. It is lighted by an electric spark taken from the main line, therefore there are no batteries to give out. It is always ready and can be lighted and extinguished 50 times in one minute. Its flame is twice as hot as the ordinary alcohol lamp, and one-tenth as expensive to maintain, to say nothing of the trouble and time saved in lighting and the great convenience to the operator.

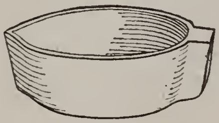

Fig. 17. GOLD REFINING CRUCIBLE.
Made of Extra Fine Assayer's Fire Clay Material.

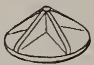

Fig. 18. NEW CROWN HOLDER.
Being very light and durable. also very convenient from the fact that it can be taken hold of with the pliers from any point.

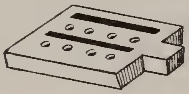

Fig. 19. BRIDGE HOLDER.
Very convenient for any sized bridge. It is easily adapted by using combination of holes and slots.

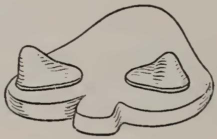

Fig. 20. PORCELAIN PLATE HOLDER.
Will hold any sized porcelain plate by adjusting the little lugs to fit the set to be baked.

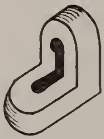

Fig. 21. HEAT GAUGE.

In closing we would like to say to the dentist who is asking himself, "Will it pay me to put electricity in my office?" "Yes, by all means; you cannot afford to be without it." And to the young man we would say make electricity your friend. Study it, understand its character, know its characteristics, and just how to handle it. It is unapproachable in promptness, ever ready to serve you, to light your way, to run your engines and your lathes, to heat your furnace or even warm your room. It rings the office bell, the first greeting of the approach of friend or patient. It will help you to run your automatic mallet and your automobile. It will keep you and your patients cool in summer with a fan. It carries your voice through the telephone over land and your words over sea by wireless telegraphy. The sun the greatest source of electricity—have plenty of it in your offices, no matter in what form. Have it in your daily life and have it in your soul.

THE RATIONAL USE OF PORECLAIN FOR FILLING TEETH.*

By Rodrigues Ottolengui, M. D. S., New York.

The utilization of porcelain for the filling of teeth apparently having been adopted as a legitimate and permanent feature of dental practice, it behooves us to determine as soon as possible the proper sphere in which it should serve us as a safe reliance.

It is but natural that, because of its likeness to tooth structure, its first and main claim upon our attention should have been for restoration of lost parts of teeth in the anterior part of the mouth. Indeed, as recently as December, 1902, we find in the Dental Review an excellent paper from the pen of Dr. Paul Guye of Geneva, Switzerland in which the author says: "I enlist myself in the ranks of the great majority who think that the esthetic qualities of porcelain should be the chief reasons to guide us in our choice of the proper filling material in a given case. This means that its use (aside from exceptional cases) must be restricted to visible cavities only." Numerous other writers have so often said the same thing that I need not quote them.

I will enter upon my argument immediately by stating that I antagonize that proposition, and declare that the chief advantage of porcelain does not depend upon its likeness to tooth structure, but rather upon the fact that it is the only indestructible filling material which is likewise a poor conductor of heat. Upon this postulate will I rest my plea for the Jenkins body, because thus at once I discount all the arguments in relation to perfection of color, and depth of cavities. I maintain that the primary object which causes a patient to seek dental aid is not the beautification of his mouth but the preservation of his teeth, and I go farther and say that in the preservation of a tooth the prolongation of the life of a pulp is of paramount importance. I must pause here to admit that I am an advocate of pulp destruction in the treatment of many cases of diseased roots; moreover that I have likewise frequently preferred to destroy and remove pulps not actually exposed even in healthy teeth. But why? Because bitter experience has taught us all that the placing of a metal filling in a deep cavity is a menace to the life of a pulp, and that no other but a metal filling, in the past, has ever proven to be permanent. Between these two difficulties the refuge has either been a layer of cement or other insulating material, with metal superimposed, or else the repeated use and replacement of gutta percha. In the first instance we have too frequently found the pulps dying in spite of skillful efforts at insulation; and in the second the renewals of the wasting gutta percha has too often brought us to the final need of pulp removal.

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*Read before the fifteenth anniversary celebration of the Odontographic Society of Chicago, February, 1903.

With the advent of porcelain as a filling material all this is changed. We have now a certain and permanent means of filling deep cavities over pulps nearly exposed, by the use of the Jenkins porcelain enamel. It may be that these cavities can be filled with high fusing material, but I have yet to see an exhibition of such work. Dr. Guye in the paper already quoted says, "It is not necessary to burnish the foil to the bottom of the cavity as it is preferable to have a rather thick layer of cement in that place." I welcome this statement in a paper which I do not hesitate to characterize as the best argument for high fusing methods which has yet been published. For this is a subconscious or perhaps unconscious admission that even with all the advanced methods of manipulation platinum remains intractible for the formation of the matrix.

On the contrary my declaration is that there must be as little cement between the filling or inlay and the tooth as possible. Aside from the time worn mechanical axiom that "the less the cement the stronger the joint" we have the admited lack of resistance of cement to masticating stress. Dr. Wedelstaedt has given us these facts in well argued but ill directed papers on this point. Dr. Wedelstaedt proved that cement has altogether too little resistance to stress, and made the deduction that it should not underlie a gold or an amalgam filling in any appreciable quantity. In this his argument fails, because where we have needed cement as an insulation, we have required as much of it as possible, consistent with the proper placing of the metal which covered it; but we are practically always able to so shape a cavity that the superimposed layer of metal may rest upon ledges of tooth bone so that absolutely no stress is transmitted to the underlying cement. With porcelain the converse is true and this brings me to a discussion of the advantages of the Jenkins method, in its relation to depth of the cavity.

ADVANTAGES OF DEPTH IN CAVITY PREPARATION.

In the preparation of cavities for the reception of porcelain, the fact that the matrix must be removable precludes the idea of cutting lateral steps having angular formations. Thus we do not attempt any shaping which will produce ledges or resting places for the filling, under which cement could abide without receiving pressure through the filling mass. On the contrary the porcelain filling is always appreciably smaller than the cavity and is surrounded and underlaid by cement. If the cement at the bottom of the cavity is thicker than elsewhere, and if it should not resist the crushing strain, as Wedelstaedt tells us it will not, it follows logically that the resistance to stress of the filling does not depend upon any quality in the porcelain used, but upon that in the cement itself, as the strength of the whole cannot be greater than at its weakest part. Consequently, the vaunted (I think over-vaunted) strength of the high fusing body is rendered nil if any great mass of cement is used under the filling, as apparently is constantly done. Many of the high fusing advocates have admitted to me that before making a matrix for deep cavities, the depth of the cavity is lessened by the use of cement, so that the matrix of platinum may be readily made. This is a weak point in the method, and one which I believe would prove disastrous if high fusing body were used as I use the Jenkins enamel, for filling deep cavities in living teeth.

In pulpless molars and bicuspids the cement may be brought up in the pulp chamber to a level with the floor of the cavity, because in such cases the porcelain filling would still have a firm seat on tooth bone.

Depth of cavity also bears a great relation to retention of the filling, and the shallowness of the cavity preparation, coupled with too great reliance upon the strength of cement as a retaining medium, must account for the many otherwise beautiful high fusing inlays which I have been called upon to replace during the last three years. I must admit here that I have not used high fusing body, and this has been mentioned by one writer as a sort of refutation of the arguments of men like myself who argue for the only method which they have used, while admitting lack of experience with others. But, gentlemen, if I get satisfactory results with the Jenkins material; if I can fill any cavity with it which seems in my judgment to require it; if I can match colors to my satisfaction when it seems needful to match them; if I can get great retaining strength by making cavities deep; if I can fill already deep cavities without using excess of cement; and if on the other hand I see high fusing inlays, perfect in other respects, made by men of skill, by men who are the champions of the high fusing art, and I see them mainly brought to me in the hands instead of in the teeth of the patients, and if on examination I find that they were merely pasted into almost flat surfaces; am I not privileged to believe that the method has limitations which are unattractive? But if, furthermore, I have never yet seen any high fusing porcelain that in any sense seemed to my eye to match tooth structure as well as the Jenkins body, have I not the right to wait until such high fusing body is shown to me before using it? If I am told that to get fine results, I must make matrices by partly swaging the platinum first; that I must in difficult cases take impressions of the cavities, and then make dies, and then swage again; and then fit in the mouth and burnish to the edges; and then bake once and send for the patient and reburnish the edges and then bake again; also that to get good color match I must use two or three layers of different body, or else afterwards resort to a system of hand painting on china and then firing, am I very, very stupid if I decline to adopt these roundabout ways of obtaining no better results than I do by simpler, more direct and shorter methods?

No, gentlemen, you cannot say I know nothing of high fusing methods because I never have tried them. You have told me too much, so much indeed, that I have not yet been tempted to try the system. But I hope you will believe that I am open to reason. I have not come so far from home, into the midst of the recognized masters of the art merely to antagonize and criticise your modes of work and to convince you that mine are better. I have come to compare notes with you, to show you my ways and to see yours, that when I return home I may better be able to choose.

Passing this digression which seemed necessary, I return to the question of depth of cavity. I have shown that it is advantageous to have at hand a method which enables the operator to fit a porcelain filling into deep cavities: first, because in cavities very deep a non-conducting filling which is permanent may be utilized: second, that in such deep cavities the filling itself may extend to the bottom of the cavity as closely as elsewhere thus obviating an excess of cement; third, that greater retention is to be had where the cavity is deep; I hardly think I need to discuss this; it will scarcely be disputed: fourth, I would point out that where the marginal preparations can be properly made, the filling if carried to the full depth of the cavity may be so set that at the very bottom all cement is displaced, the filling thus being seated squarely upon tooth bone with no substratum of cement. Thus all the weakness of the cement is obviated, while retention is still secured because of the cementing medium adhering to the lateral walls and surrounding the filling: fifth, I call attention to the fact that in cavities having standing but weak walls, such a case for example as a bicuspid with caries on both approximal surfaces and through the occlusal surface, the two cusps standing, a single filling may be made to perfectly fit and fill such compound cavity, and because of the minimum of cement will better sustain and retain the frail walls than a filling made by any method which cannot be carried into intricate positions.

As another example of the utility of a system which enables one to form matrices for deep cavities, I will cite a case from practice. A patient came to me this winter from the hands of an artist in the high fusing method. She had been in his care only three weeks prior to her visit to New York and came to me to replace a filling which had dropped out. On examination I found that several examples of his work were excellent as to adaptation and would undoubtedly do good service; that none of them were remarkable as to matching of color, or resemblance to the surrounding tooth structure and that nearly all of the smaller ones had been ground after setting, evidently to remove the spherical wart-like appearance which is hard to obviate in small cavities. With those in position, therefore, I could see no advantage which would cause me to abandon the Jenkins enamel. Coming to the lost filling, the argument is most instructive. This was the distal corner of a central incisor. The loss by caries had been very slight, yet I agreed with the previous operator that porcelain was to be preferred to gold. But my predecessor had merely cut out a shallow cavity of semi-spheroidal shape (concave of course) and having easily made a filling admirable in shape, good in color, had then etched the under surface and pasted it in. For such a piece of work I never should have expected more than two weeks duration. I was surprised that it had held in place more than three. Close examination showed slight abrasion along the incisive edge, so that the dentine could be just seen between the labial and lingual plates of enamel. My procedure was as follows: With a tiny rose bur the true cavity was extended between the plates of enamel as far across the incisive edge as to reach the limits of the abraded surface, this being nearly to the opposite corner, but not far enough to weaken that region. Thus the cavity was altered to a groove, which was slowly deepened, the lingual plate of enamel being cut away until what was to be the cavity margin was free from contact in occlusion. In other words, it was so fashioned that when in position the lower incisors struck about the center of the porcelain filling. The groove shape was kept, however, of such depth that the porcelain filling extended as deeply into the cavity between the walls as it extruded therefrom. This filling when set, was not seen at all from the labial aspect, except at the corner restoration, the labial plate of enamel having been left undisturbed. Along the lingual aspect the filling covered about twice as much surface as that of my predecessor, but it is to be observed that the depth of the cavity coupled with the firm seating and direct resistance to masticating stress solved the problem of permanency. There was no longer a question of its retention. On the contrary it would be impossible to intentionally remove it without fracture of the tooth.

This is so convincing an argument in favor of the value of a system that enables one to fill deep cavities that I regret exceedingly that I have been unable to bring a specimen with me. But

My antagonism to platinum is largely due to my experiences with it and with gold. I have used the platinum for matrices but never with as complete satisfaction as with any form of gold. Next, my first efforts with gold were not so satisfactory, using rolled gold 30 gauge as when I adopted gold foil of same gauge. And now I am getting still better results than ever with the same gauge of gold prepared especially for inlay work by the Consolidated Dental Manufacturing Company. This special gold is treated according to a formula suggested by Dr. Hirschfield of I spent all of two Sundays trying to make such a preparation in a tooth out of the mouth, but without success. The operation requires too much delicacy and the dead teeth proved too brittle.

This brings me to another class of cavities somewhat similar. These are the upper incisors where we find abrasions on the incisive edges which demand attention. I still believe that gold or gold and platinum is best, but where appearances count, porcelain may be used with success provided the cavities may be cut deep. A thin inlay in this region whether made of high fusing body (the strength of which I still doubt) or of Jenkins enamel, should not be expected to long continue without fracture. But with the Jenkins method the cavity may be made so deep that the filling will be strong enough to withstand any strain normal to the region.

COMPARATIVE VALUE OF PLATINUM AND GOLD AS MATRICES.

Much has been said in favor of the argument that platinum may be successefully used in inlay work. This I am ready to admit without question. In inlay work, certainly! But in filling teeth? There we find an argument. I fancy that the high fusing advocates are so restricting their sphere of operations that they can and do say truthfully that they get perfect results. Indeed within these limitations I am prepared to have shown to me specimens of work which I cannot reproduce, for anomalous as it may sound, I lay no claim to unusual skill in porcelain art. But when we reach that class of cavities in which porcelain may and should be used as a conserver rather than a beautifier of teeth, I am prepared to cross swords and make contest. And my self-reliance is not based upon any imagined skill, but upon the method which gives me greater scope than at present I fancy is afforded by any other.

Paris who ordered a lot made for his own use, and then forwarded some to Dr. Jenkins, who in turn sent some to me. Fortunately for us all, Dr. Hirschfield has not made any secret of this formula and as I understand it the Consolidated is at liberty to supply it to any who may desire it. In my hands it has given unexpected satisfaction. It is as soft and pliable as tin foil. I have only to say that since using it even in deep and difficult cavities I have not as yet had a single matrix tear. While slight tears are no insurmountable objection, a matrix without a hole in it is always an advantage. My argument then is, that as I have found that even different forms of gold present inestimable advantages because of varying degrees of pliability, it follows that any gold is more suitable than platinum for an accurate impression of a cavity, barring one point. Platinum being more rigid, is less likely to have its shape altered in removal. But the gold matrix can be removed from any properly shaped cavity without alteration of shape. In evidence of this I have frequently made the following experiment: I have made a matrix of gold, and in it a filling. Then a second matrix reinforcing it by imbedding it in plaster of paris. Then I have stuffed the original matrix from the completed filling placed the filling in the second matrix, and found it to fit perfectly, the fit being even better than to the tooth itself, which is natural.

It may not be amiss to touch upon the technique of making the gold matrix in deep cavities. After all, gold is a metal as well as platinum and obedient to the same laws, though in a measurably less degree; laws I mean which hinder our work. For example, in forcing a square of gold into a deep round hole it necessarily wrinkles. My procedure is as follows. Supposing the cavity to have considerable depth, I anneal a suitable square of gold foil and lay it in the palm of my hand. I then take a pair of foil carriers which has round points to avoid tearing the foil, and grasping a piece of spunk press upon the foil till it curls up. Still holding the spunk, it with the foil is carried to the cavity and gently pressed into it, very slight pressure being used till it is carried completely to the bottom. This is contrary to Dr. Guye's mode. The tweezers are now removed leaving the spunk in place, and a blunt instrument is carried to and pressed upon the spunk so as to firmly hold the matrix down in place. Then with the tweezers the folds of the matrix are gently unfolded, and with a wiping motion, a piece of spunk forces the wrinkles out, the movements being from the bottom of the cavity up along the walls and over the cavity margins. The folds will not always remain straightened out at the first essay, but with a little persistence even a bad fold may be entirely removed in this manner. The matrix having been accurately pressed against all the walls, the cavity is now packed as tightly as possible with spunk, all the force being used that can be used without tearing the gold. Up to this time no attention has been paid to the margins; now the gold is folded over the margins, and where at all possible made to take proper shape against them by pressure with the end of the bare finger. Such margins as cannot be thus reached must be burnished with steel burnishers. At this point the spunk in the cavity is entirely removed, and if the excess of the matrix foil apparently would interfere with proper removal, the matrix should now be carefully removed trimmed and replaced, but it is advisable to leave all excess that will not interfere with removal, as it is this excess and not investment as has been erroneously stated too often, which prevents alteration of shape of the matrix in subsequent manipulations. The matrix is then replaced in the cavity, held firmly at the bottom thereof with one piece of spunk in the tweezers and the burnishing completed.

INVESTMENT OF THE MATRIX.

Many writers have claimed as a great advantage for the platinum matrix that it can be replaced in the cavity and reburnished. They entirely overlook the fact that this is an admission that the distortion with the body used by them must be considerable if such a procedure is necessary, when it is not at all necessary with the Jenkins body, though it is my belief that high fusing body used as we use the Jenkins body, can be employed without the need of the much talked of second burnishing. That I may not appear to talk in riddles let me explain that, without experience I imagine that the distortion of the platinum matrix which renders the second burnishing advisable is due to the use to too large a mass for the first bake and the desire to get through too quickly. The investment of the gold matrix is not a resort to avoid alteration of the shape of the matrix but rather a means of handling the matrix with greater facility. There is no cavity for which a filling with high fusing material can be made, for which I will not attempt to make one of Jenkins enamel, without investing the gold matrix.

This has been said and ignored so often that I will repeat it. It is not necessary to invest the gold matrix, and it can be as easily returned to the cavity in the tooth for reburnishing, examination of contour or any other purpose, as can the platinum. This I am ready to demonstrate.

COLOR.

In regard to color, while I have said that in my practice I am using porcelain more for fillings in deep cavities than for inlays in visible positions I am of course also using it for the latter purposes. I may be entirely wrong, since I have not seen the work yet, but from the published descriptions of work it seems to me that the methods of obtaining effects advocated by Dr. Reeves, or the process of mineral painting advised by Dr. Brewster shows that the high fusing body per se is not a satisfactory material for the matching of teeth in the mouth. And this view seems tenable when I consider the samples of high fusing bodies which I have seen, for absolutely none of them to my eye has had the desirable qualities of appearance possessed by the Jenkins enamels. And just at this point I would call attention to what may not have been noted by my hearers. Throughout this paper I have said nothing of low fusing porcelains. I know nothing of them from practical experience any more than I do of the high fusing. In the papers published in the Dental Review last November high and low fusing bodies were considered and the consensus of the argument was all against the low fusing. I claim that the Jenkins body is not to be classed with the low fusing bodies on the market, and the faults of the others attributed to it. The Jenkins enamel is a thing apart. A material prepared by processes of manufacture not in vogue in any other laboratory, and the result a substance with characteristics not possessed by any other filling material high or low fusing. For example I very rarely mix two shades to produce an effect, though of course this can be done. I have seen few cases and they were pulpless teeth usually discolored, that I could not match sufficiently well with a shade at hand. Moreover, I must contend that these enamels can be baked with a marvelous exactness as to color, provided they be not baked in an electric furnace. I can bake a porcelain inlay, provided I can look at it during the process, with absolute certainty of my result; I can even get a very slight variation of shade without injury to the body merely by the method of fusing. Can such results be obtained with high fusing body, the fusing of which is a matter of guess work, in a furnace into which the eye cannot gaze? But there is another point. Suppose that I grant you your more exact match of color shade by your complicated method of three-ply fusings or hand painting, do you get a better match for the tooth? I have not seen it; perhaps you have something of the kind to show me. But there is a something in the Jenkins enamel, not possessed by other materials, which gives it what I shall call a life-likeness to teeth in the mouth. With your high-fusing body and your paint you may get a likeness to the tooth, but do you get a life-likeness?

Again let me say I have not been troubled by that great bug-a-boo, shadow problems. Perhaps if you saw my work you would say I ought to have been. Still my patients and I have been sufficiently well pleased with color matching thus far. The formula is very simple. Fillings in high light, as on labial surfaces should be a shade darker than the tooth; in the shadows of approximal surfaces they may be made just a shade lighter.

CONTOUR WORK.

The utilization of porcelain for the restoration of contour is still largely in the experimental stage. The greatest progress has been made in the replacement of lost corners in incisors. Even the high fusing advocates, who claim that their body will stand up better than the lower fusing materials, often if not always must resort to some grinding and polishing to obtain the sharp corners and square edges often desirable. In this connection I have the pleasure to present to you for the first time in this country the latest invention, which comes from Dr. W. F. Mellersh of Surbiton, England. Dr. Mellersh has had the Dental Manufacturing Company of England make for him small triangles of porcelain of tooth body similar to that used in the Ash teeth, and the company is applying for patents in America, England and other countries. With this body the Jenkins enamel harmonizes admirably. The matrix is made in the usual way and Jenkins enamel fused in it till the tray is practically flush. Then one of these thin triangles of baked enamel is set in position and fused to the body already in the matrix. This serves as a sort of supporting piece for the subsequent bakes and it is claimed that the contours can be made more accurately and in less time. These triangles of enamel are to be furnished in numerous shades to match the Jenkins colors.

In the bicuspid and molar regions large contours have been made, but it is my idea that later much larger fillings of porcelain will be the resort, full occlusal surfaces being restored, instead of the present system of crowning. I have already done a few molars and recently met with satisfactory success with the full masticating surface of a bicuspid which was carious to a depth which threatened the pulp. In such restorations of molars, the difficulties of correct occlusion and knuckling remain to be carried beyond the realms of mere guess work. Dealing with such large masses, however, it is quite possible to overbuild, and then make the proper adaptation by grinding, the Jenkins enamel receiving a fine polish.

RATIONAL USE OF PORCELAIN.

In conclusion let me answer the question: What is the Rational Use of Porcelain? My reply is, that the utilization of porcelain should not invariably depend alone upon its esthetic qualities but likewise upon its preservative features. This will bring it into vogue more and more in posterior cavities of large size, and it will replace amalgam and the plastics rather than gold.

THE PRACTICAL APPLICATION OF THE PRINCIPLES OF THE BONWILL ARTICULATION.*

By O. A. Weiss, D. M. D., Minneapolis, Minn.

The casual observer of proceedings of dental meetings and our current literature as well, would be led to believe that the only thing of importance in dentistry is "OPERATIVE DENTISTRY."—While we all agree that conservative dentistry should be our watch-word, be preserved in all cases, in other words, the time is not yet at yet, all must admit, that the natural dental organs can not always hand and, moreover, will probably never be, when artificial dentures will not be required.

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*Read before the Minnesota State Dental Association, St. Paul, 1902.

Dental prosthesis, or more particularly, the construction of artificial dentures occupies an important place in the practice of dentistry today as well as in the past, and no doubt always will do so.

I wish to state here that no branch of dentistry demands greater accomplishments on the part of the dentist than is required in prosthetic dentistry. The mere fact that this work is so frequently entrusted to the laboratory assistant, or sent away to some dental laboratory, is no proof that nothing more than simply a little mechanical ability is all that is required. In order to be a master in this branch of dentistry, not only is the highest degree of mechanical skill and understanding required, but the highest degree of artistic ability as well, combined with good judgment based upon a thorough knowledge of all the elements that enter into success or failure in this work. It is just as important that we thoroughly understand everything that militates against success as that which favors it. The prevailing idea regarding this branch of dentistry seems to be that it is like unto that of the carpenter or mason upon some beautiful structure without an architect. Would anybody expect ordinary carpenters and masons to build a beautiful structure without an architect? They would undoubtedly build some kind of a structure but the success of such building would depend upon how much of an architect they were.

Now, in prosthetic dentistry we must be both architect and builder, and if anybody doubts the statement previously made—that no branch of dentistry requires greater accomplishments on the part of the dentist than does prosthetic dentistry—I would suggest that they make careful search and report what percentage of dentists they find who possess these qualifications in a full measure.

Possibly some of you may say it is not necessary for the dentist to be the builder; if he is the architect it is sufficient. I am well aware that some of our most eminent men practice upon this basis, and some of these same men give evidence of very poor architecture.

I want to say here, with all the force at my command, that you might as well separate the artist from his paint and brush, or the sculptor from his clay, and expect him to direct some one else in producing a work of art. While this might be possible, I am sure there would be nothing gained by the artist so doing. I would not have it understood however that an artificial denture could not be properly made unless the dentist making it did all the work upon it, but he must do more than simply take the impression and deliver the finished case as is so often done.

He should in addition arrange and articulate the teeth, and try them in the mouth to perfect the same; the remainder of the work may then be entrusted to the laboratory man.

Every case of artificial denture construction is a study, and only the person who has examined the patient carefully is competent to arrange and articulate the teeth. He must be an artist in order to know what the case in hand requires.

One of the reasons why this branch of dentistry has fallen into disfavor is the annoyance and trouble so often encountered in serving patients in this capacity, and this in turn is due to ignorance on the part of the dentist or to false precepts he has accepted.

The dentist who in this work succeeds in one case and fails in another, not knowing why in either instance, is far from being master of what he professes, and unfortunately this is the situation too frequently met with.

It should be thoroughly understood that there are two fundamentals to be considered in artificial dentures, viz.: the useful or functional, and the artistic. It should be further understood that these often militate against each other, that is, we can not always combine these, each to its fullest extent; one having to be sacrificed for the benefit of the other. This fact, however, can not be used as a shield for ignorance or poor judgment.

Now to take up the subject under consideration; it must be admitted that one of the elements that enters into the successful artificial denture is correct articulation of the teeth.

I desire to say at the very outset, however, that success is not dependent upon articulation alone. There are other things fully as important, viz.: the length of the teeth; their relation to the alveolar ridge; the size and character of the palate and alveolar ridges; the relation of the two arches to each other; the habitual movements of the jaw; all of which are variable factors and tend to influence the success or failure of a case.

The subject of articulation, however, is all we are to consider today. The Bonwill articulation of teeth was given to the profession many years ago, and as most of you know, this was regarded by Dr. Bonwill as his masterpiece in dentistry. Notwithstanding that this method of articulation was introduced so long ago, it has not come into general use as you all know and is not generally taught in our colleges today. While it is true that most of our collegs are using Bonwill articulators, that does not mean Bonwill articulation, and unless the principles of this articulation are fully carried out, it matters but little what form of articulator is used. The benefits of correct articulation are not derived unless we have correct articulation in the mouth.

Now, there are some very good reasons why this method of articulation has not come into general use, and the reasons are not only because of the work in grinding and arranging the teeth.

Before proceeding further I desire to say that the principles of the Bonwill articulation are correct. I desire to repeat this statement with emphasis in order that there may be no misunderstanding of my position regarding the Bonwill articulation.

One of the important reasons for this system of articulation not having come into general use is because we have no generally applicable articulator whereby these principles can be correctly carried out and have it work in the mouth just as it does in the articulator. In others words, none of the articulators now at our disposal, will exactly reproduce the movements of the jaws of all cases presenting to us for services, and for this reason we rarely have the principles of this articulation operating in the mouth when the plates are transferred from the articulator to the mouth. And, as the Bonwill articulator does not correctly reproduce the movements of the jaw, together with an injudicious application of another feature—the over-bite, which will be fully dealt with later—some most dismal failures resulted in trying to use this system of articulation.

Another reason is that the practical application of these principles has not been presented so that many could grasp and apply them correctly in the mouth with the aid of such articulators as are at our disposal.

One of the objects in view in presenting this subject will be to show you how to carry out these principles in the mouth after the articulation has been made in the articulator, as we can not rely upon our articulator alone.

It has been found that not often will teeth articulate in the mouth as they do in the articulator, and I have seen no presentation explaining what to do when it is found that the teeth do not articulate correctly in the mouth when they did in the articulator.

As a matter of fact, my observation has been that many who have tried to use this system of articulation were not able to determine whether it was correct or not when trying it in the mouth.

Dr. Bonwill says, "only occasionally is it necessary to grind a cusp a little here and there" when the plates are placed in the mouth, but he failed to explain to us about the "here and there."

So far as I have been able to learn, all who have attemtped this articulation, practically reached the limit of their resources when the articulation was finished in the articulator. Some would attempt to improve it in the mouth by grinding "here and there," only to find, however, that their efforts were very uncertain of desired results, and many times the articulation was made worse, because of a movement of the jaw which is not provided for in the articulator, and which is not taken into account when trying to perfect the articulation in the mouth.

Some most conscientious dentists have given up in despair in trying to use this system of articulation because they were not at all certain what the results would be. At least, they were not able to see that their patients were any better satisfied, and there have been instances where patients have been better pleased with teeth that were set up in a plain-line articulator.

It is because of failure, by many who have tried to use this articulation by means of the Bonwill articulator, to obtain any better results than was obtainable with a plain-line articulator, that it was abandoned. In reality, they were not able to carry out the principles of this articulation in the mouth, which then made it no better than that obtained with a plain-line articulator, which had the advantage of requiring much less work. In fact, many times when the bicuspids and molars had been ground with deep grooves as are necessary when there is much over-bite of the incisors, it was found that they did not work as well in the mouth as teeth which had not been ground at all and which had been set up in a plain-line articulator. Naturally then, this system of articulation was condemned and abandoned. But I shall show you that it was the method of carrying out the principles of this articulation which was at fault and NOT the principles.

These principles of articulation when judiciously applied and correctly carried out will prove satisfactory, and certainly are better than any method of occlusion—all other methods being simply occlusion.

There is another thing which undoubtedly has given rise to much trouble in using this articulation and thereby delayed its general adoption. Dr. Bonwill claimed that the teeth from the cuspids back should run in a straight line toward the condyles (i. e. the arch line—not the occlusal line). This resulted in the molars of the upper jaw being placed much outside of the alveolar ridge in many cases, and of necessity caused more or less tipping of the plate in mastication notwithstanding Dr. Bonwill's claim to the contrary, that there would be no tipping of the plate if the teeth articulated correctly. Any one, however, can quite easily prove the error of that statement. While it is true that the general arrangement of the natural teeth is closely in accord with Dr. Bonwill's claims, it does not follow, however, that nature's plan for natural teeth must be the unalterable guide in arranging artificial teeth.

While it is desirable to so arrange the artificial teeth—bicuspids and molars in a straight line from the cuspids to the condyles—for the purpose of making the palate as nearly as possible of normal width, yet, for the purpose of mastication it can not be denied that the more the molars are placed outside of the alveolar ridge the greater will be the tendency for the plate to tip when a bolus of food is upon one side only.

Let us now analyze the movements of the jaw and then examine our articulators to see how nearly we can reproduce them, whereupon we will readily see why an articulation made in a Bonwill articulator fails to operate in the mouth. By referring to Fig. 1. it will be observed that the bars which are attached to the upper and lower jaws, when in normal occlusion are parallel, but in Fig. 2 where the jaw has been moved to one side it will be seen that the bars are no longer parallel, showing that the jaw does not move laterally in a straight line, or, in other words, does not move in parallel lines. This peculiar rocking motion in the lateral ALWAYS is found in varying degrees in the natural movements of the jaw, and here we immediately get a clue to the trouble met with when placing teeth in the mouth which have been articulated in a Bonwill articulator, where the bows representing the jaws move in parallel lines. This peculiar rocking motion in the lateral

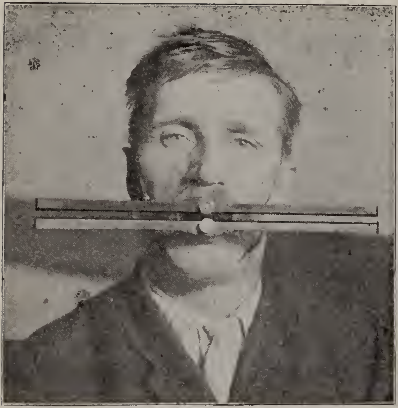

Fig. 1.

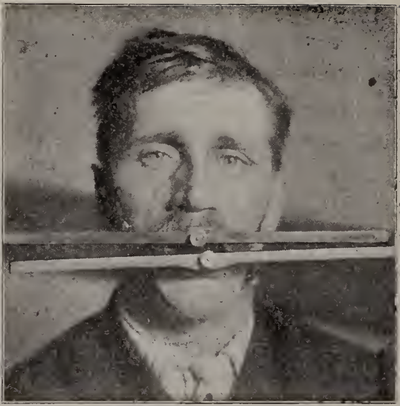

Fig. 2.

movement of the jaw is due to the plane of the temporo-maxillary articulation, or the "condyloid-path"—the path traveled by the condyle in the glenoid fossa as Dr. W. E. Walker has expressed it—being inclined.

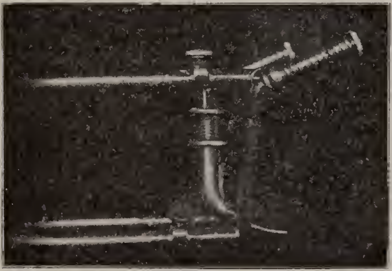

Fig. 3.

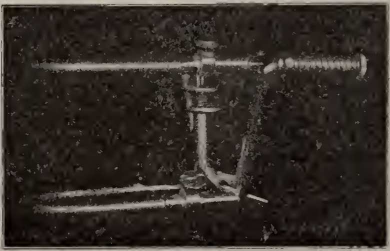

Fig. 4.

Fig. 3 shows Bonwill articulator as modified by the author. Fig. 4 shows original Bonwill articulator with the adjusting screw post added.

Dr. Walker was the first to call attention to this fact several years ago, and demonstrated by an apparatus which he has called a "facial clinometer" that the condyloid-path is upon an inclined plane instead of a level one as represented by the arms carrying the spiral springs in the Bonwill articulator, Figs. 3 and 4.

In the lateral movement of the jaw one of the condyles moves forward while the other remains practically stationary excepting a slight rotary movement, and, as the condyle moving forward also moves downward at the same time, it causes a lowering of the jaw upon that side and throws it out of parallel with the upper.

thus giving rise to a kind of rocking movement, or a lowering of the jaw upon one side and then upon the other as it moves from one side to the other.

In the '97 Cosmos Dr. Walker's excellent articles upon this subject may be found and every one desirous of obtaining the fullest understanding of the principles of articulation should read them.

Dr. Walker showed further that this inclination of the condyloid-path varied in different persons and occasionally the right and left sides of the same person would vary. Dr. Walker introduced at the same time his adjustable "physiological articulator," which makes provision for this inclination of the condyloid-path and its variations, but owing to the complexity of the apparatus and the great care necessary in using it, it has not come into general use.

Other anatomical articulators have been introduced since then, wherein provision is made for the average inclination of the condyloid-path, but as all these later articulators have the condyloid-path made in connection with the upper bow or jaw of the articulator, so that any up or down movement of the bow, such as is liable to occur when mounting thick or thin casts of the mouth, causing a change in the inclination of the condyloid-path, I have retained the Bonwill articulator but modified it by bending the arms carrying the spiral springs upward to an angle of about 30 degrees from the level (Fig. 3), which gives a fair average of the normal condition, and any discrepancy in articulation between this and the case in hand, is corrected when the trial-plates are tried in the mouth for articulation.

Let us now briefly consider the principles of articulation; they are simply that in the lateral movement of the jaw, the teeth should be in occlusal contact upon both sides, and in the forward movement there should be occlusal contact upon the anterior and posterior teeth in order that the plates may be kept nicely balanced in the various movements of the jaw. In other words, there should always be contact at three points, viz.: upon each side and in front. This should not be understood to imply that all the teeth upon both sides and in front too, are to be in occlusal contact all the time in all the different movements of the jaw. This I have found is what is often understood by many who have not become thoroughly familiar with this articulation, and in trying to carry out this wrong idea when making the articulation in the articulator, much time was spent without other result than more or less serious disturbance of one's peace of mind and the arising of strong suspicions that the problem is too difficult of attainment and not worth the effort.

Whenever one side is moved forward—as in a lateral movement of the jaw—the bicuspids upon that side will not be in occlusal contact; and when the jaw is moved directly forward so that the incisors meet on their incisal edges, the bicuspids upon both sides will not be in contact. The space between the occlusal surfaces of the bicuspids when the jaw has been moved forward, will be greater or less, as the over-bite of the incisors is greater or less.

By referring to Figs. 5 and 6 which represent both what is required as principles of articulation, and what is necessary in the form and line of the cusps—buccal and lingual cusps of the two sides in a straight line—in order to bring these principles into operation in a Bonwill articulator.

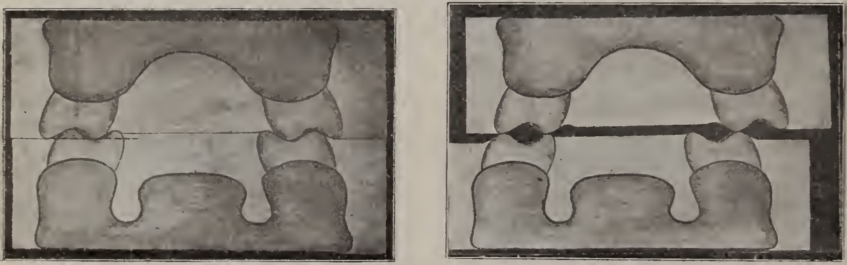

Fig. 5. Fig. 6.

This shows occlusion and articulation in the Bonwill articulator; also shows that buccal and lingual cusps of both sides are in a straight line or on a level plane.

It will be seen that in normal occlusion in the articulator (Fig. 5) and in the lateral movement of the same (Fig. 6) we have occlusal contact upon both sides in each instance, which is correct. Now by referring to Fig. 7 we see what takes place in the mouth when these same teeth are transferred from the articulator. Normal occlusion in the mouth will be the same as in the articulator (Fig. 5) providing the bite was correctly taken and the casts correctly mounted in the articulator, but Fig. 7 represents the jaw moved to one side and shows occlusal contact upon one side only, which of course is wrong. This is the result almost always met with in varying degrees when teeth which have been articulated in a Bonwill articulator are transferred to the mouth.

Thus we see one of the reasons of failure in trying to use this system of articulation.

Dr. Bonwill laid down a great many principles which he called nature's laws, regarding the size, and arrangement of the teeth in the arch; also regarding the over-bite of the anterior teeth and the relation of the length of the cusps thereto; and the curvature in the line of occlusion with its relation to the over-bite—that when we have much over-bite we need longer cusps and a greater curvative in the occlusal line. He called attention to the fact that in making an artificial denture only a little over-bite is necessary. Now, this is a very important point and should be strongly emphasized. He did not explain to us that an extensive over-bite is a detriment to the proper working of the plates in the mouth even though we have perfect articulation; and herein is where many have failed to get the benefits of correct articulation, having made a more or less extensive over-bite of the incisors, which in turn necessitated the grinding of deep grooves in the bicuspids and molars, so that even if the articulation had worked correctly in the mouth (which it seldom does as the teeth are taken from the articulator) more or less movement of the plates followed in moving the jaw, owing to the deep meshing* of the cusps.

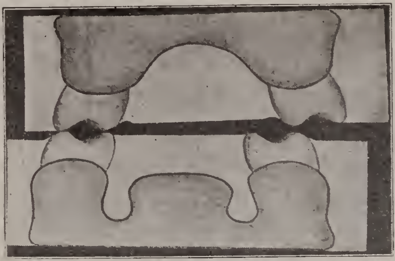

Fig 7.

This illustrates what we find in the mouth, with teeth having been articulated in a Bonwill articulator when the jaw is moved to one side. This representing the mouth viewed from the front, it will be noticed there is no contact upon the left side—jaw having been moved to the right. This lack of contact is due to the cusps being in a straight line, and the jaw having lowered upon the left side as it moved to the right. Had the lower buccal cusp been longer than the lingual, and had the upper lingual cusp been longer than the buccal, as in Fig. 9, contact would have been maintained upon both sides as in Fig. where the lowering of the jaw has been the same as in this.

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*The term mesh or meshing is used here as in machinery, signifying the engagement of gear-wheels by their teeth or cogs. If the teeth of gear-wheels are short and do not mesh deeply we may have a "slipping of cogs," i. e. one wheel slips by the other, which will not occur if there is deep meshing of the teeth or cogs. In an artificial denture having deep meshing of the cusps we will find that the teeth will not glide over each other in the lateral movements without considerable movement of the plates.

We find that nature frequently makes a great over-bite—sometimes two-thirds the length of the crowns, but this works no harm in the use of the natural teeth because of their attachment in the jaws.

In the natural denture we find that nature does not always adhere to some of the laws or principles which Dr. Bonwill says governs her work in this respect, viz., the relation of the curvature in the occlusal line to the over-bite, and moreover we find that it matters not much in mastication, because the teeth can not be displaced owing to their attachment in the jaws. I have made a large number of examinations of the mouths of persons of various ages, where the natural teeth were present, regarding the relation of the curvature in the occlusal line to the over-bite, and almost without exception found a lack of occlusion in the molar region when the jaw was protruded so that the incisors met on their incisal edges. Of course it goes without saying if there is no occlusion of the molars when the jaw has been protruded, there is none of the bicuspids. It was only in a few cases where there was no over-bite that molar occlusion was found when the jaw was protruded. The greater the over-bite the greater was the lack of molar occlusion when the jaw was protruded. This is significant regarding another matter which I shall take up later.

Dr. Bonwill claimed in those cases where no over-bite was made no curvature in the occlusal line is necessary, but I shall show you that the over-bite of the incisors is not the only thing that determines the curvature in the occlusal line, that we do require curvature in the occlusal line in most cases, even though there be no over-bite. (See Fig. 15.) True, when little or no over-bite is made, less curvature is required, yet, some curvature is nearly always necessary as we shall see later.

Let it be thoroughly understood that this curvature in the occlusal line is for the purpose of retaining occlusal contact of the molars when the jaw has been protruded so that the incisors meet on their incisal edges. If there is no curvature in the occlusal line we will not have molar occlusion when the jaw is protruded. The inclination of the condyloid-path has much to do with the amount of curvature required in the occlusal line. Even though there be no over-bite more or less curvature in the occlusal line is required varying with the inclination of the condyloid-path. Should there be no inclination of the condyloid-path, then if no over-bite were made, no curvature in the occlusal line would be required. By referring to Figs. 16 and 17 it will be seen that a certain curvature was made to accommodate a certain over-bite; now, by examining Figs. 20 and 21 it will be seen that the same over-bite requires a much greater curvature; Fig. 22 compares the two curvatures, clearly showing the difference. In Figs. 16 and 17 the condyloid-path is not inclined, while in Figs. 20 and 21 it is. This shows conclusively that the over-bite alone does not determine the curvature. In Figs. 16 and 17 the articulation is made without inclination of the condyloid-path as in a Bonwill articulator; in Figs. 18 and 19 the same articulation is seen as it operates in the mouth, showing lack of molar occlusion when the jaw is protruded. Here again, we see another reason of failure in trying to apply these principles of articulation by the aid of the Bonwill articulator.

The significant feature previously referred to concerning those examinations of the mouth which I made, is found in the claims made by some regarding the changes that the temporo-maxillary articulation will undergo as a result of the articulation of the teeth. At our last meeting in connection with a system of occlusion there presented, wherein it was attempted to show articulation, the claim was set forth that the temporo-maxillary articulation became changed in a few weeks, accommodating itself to the occlusal surfaces of the teeth, which in this system of occlusion were ground to a flat or level plane. I here desire to ask you to consider, if changes occur in the temporo-maxillary articulation as easily as has been claimed, why do we not find it so when the natural teeth are in the mouth? If it is the occlusion or the articulation of the teeth that modifies or govern the movements in the temporo-maxillary articulation we should then certainly expect to find harmony between them, where the natural teeth are present and have been exerting their influence for many years, instead of the lack of harmony that was shown in the examinations referred to. Now, any one of you can easily make these examinations; all that it is necessary to do is to have the person protrude the jaw so that the incisors meet on their incisal edges and then examine the occlusion of the molars when I am sure you will find as I did, very few cases of occlusal contact.

The only possible influence that articulation of artificial teeth might have upon the temporo-maxillary articulation is to gradually limit its range of movement to simply that of a hinge—open and shut—owing to movements of the plates when making other movements of the jaw. The patient might unconsciously do this after a time—that is, limit the movements of the jaw—but if it is done, it undoubtedly is done because of necessity, there not being correct articulation of the teeth, other movements of the jaw than a simple hinge movement would cause more or less movement or displacement of the plates.

To return now to the over-bite, which I said is a very important point in making an artificial denture. The least possible over-bite is all we should ever make in making a full artificial denture, because by increasing the over-bite we must relatively increase the length of the cusps, the depth of the groove, and the curvature in the occlusal line; this is detrimental to the nice retention of the plates in the mouth during the various movements of the jaw other than the simple hinge movement, because of the deep meshing of the cusps. You can very readily see that cusps ground thus will be more likely to cause movement or displacement of the plates in mastication than when ground like this:

It is because of absence of this deep meshing ofthe cusps, that the better results claimed for a flat plane occlusion, are due; and there can be no question but that a flat plane occlusion of the teeth which do not articulate will be more satisfactory for practical purposes than the most perfect articulation having a great over-bite with the necessarily great curvature in the occlusal line and the long cusps and deep grooves. But, it is not necessary to have a great over-bite and deep meshing of the cusps in order to make articulation of the teeth. We can not have articulation with a flat plane occlusion except in a very few cases; but we can have articulation in all cases with a comparatively flat plane occlusion; and this the acme of articulation.

The last point that I now wish to call particular attention to, is the line or plane of the cusps bucco-lingually. Dr. Bonwill's presentation was that the buccal and lingual cusps of the two sides are in a straight line. Now this is not only wrong as regards nature's arrangement, but the teeth so arranged will not articulate when placed in the mouth excepting a very few cases. In setting up teeth in a Bonwill articulator it is necessary to place the cusps in a straight line bucco-lingually (Figs. 5 and 6). Referring again to Fig. 7 we see when placing teeth so arranged, in the mouth there is contact upon one side only, when the jaw has been moved to one side. In order to have the teeth in contact upon both sides in the mouth, when the jaw is moved to one side, the buccal and lingual cusps can not be on the same level. In the lower, the buccal cusps are on a higher level than the lingual, and in the upper we find them to correspond. This makes an inclination of the occlusal surface of the upper toward the cheek, while in the lower it is the opposite (Figs. 8 and 9). This is as we find the natural teeth, but it is impossible to make this arrangement in the Bonwill articulator and have the teeth articulate in the articulator. In order to give this inclination of the occlusal surfaces of the teeth in an articulator the condyloid-path should be inclined as in Fig. 3. In Figs. 8 and 9 we see the articulation made in such an articulator, and Fig. 9 shows that we have occlusal contact upon both sides when the jaw has been moved to one side.

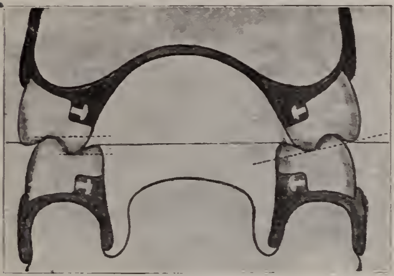


Fig. 8.

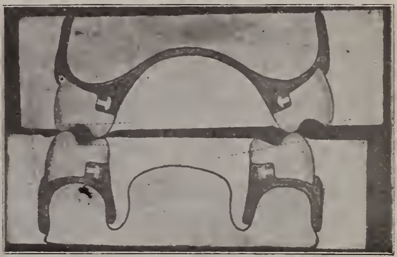


Fig. 9.

This represents occlusion and articulation in a modified Bonwill articulator; also illustrates the *inclination* of the *occlusal surfaces* of the molars. In Fig. upon the left side (viewed from the front same as looking at the teeth in the mouth) it can be noticed that the *long buccal cusp* of the *lower* opposes the *long lingual cusp* of the *upper*, in this way compensating for the lowering of the jaw upon this side (the left side) as it moves to the right.

Now for a few suggestions to help you to carry out the principles of this articulation in the mouth by the aid of a modified Bonwill articulator, or any other anatomical articulator having an inclined condyloid-path.

After an articulation has been made in the articulator the trial-plates must be tried in the mouth and the articulation tested and perfected if not correct.

To test an articulation in the mouth, by simply looking at it avails nothing. I am not aware that the testing of an articulation in the mouth and perfecting the same when required (which is nearly always) has ever been presented. Trying plates in the mouth has always been done for the purpose of testing the "bite," that is, to ascertain whether the patient bit to one side or protruded jaw, and for ascertaining the artistic effect; but these are entirely foreign to articulation. True, the bite must be correct in order to have articulation, but we may have a correct bite when trying the plates in the mouth and still not have articulation. As previously stated our resources in articulation were practically exhausted when the work was finished in the articulator, and that is the reason why the beneficial results of correct articulation have not been obtained. The idea has been held out that if we have correct articulation in the articulator, it must be correct in the mouth, excepting the possible grinding of a cusp a little here and there. Nothing could be farther from the truth.

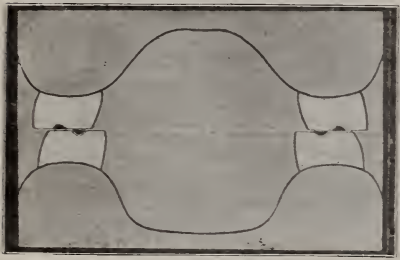
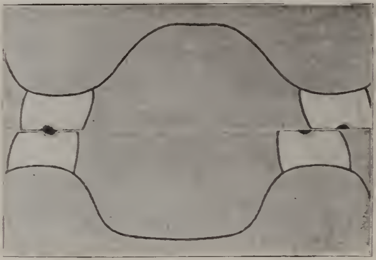


Fig. 10.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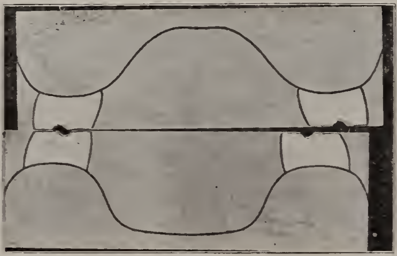
Fig. 12.

Figures 10 and 11 illustrate occlusion and articulation in the Bonwill articulator of the 'flat plane occlusion." Fig. 12 illustrates the same when placed in the mouth and the jaw moved to one side; showing contact upon one side only.

The first thing to test is normal occlusion, not for the purpose of ascertaining the correct relation of the jaws, but, to find whether all the teeth are in occlusal contact and whether the plates are resting firmly upon the alveolar ridges all the way round. We sometimes find the teeth in occlusal contact all around, but by using a thin stiff spatula between the teeth in bicuspid or molar region we may find that the teeth are easily forced apart, showing that one or possibly both plates were not resting firmly upon the alveolar ridge. The spatula should always be used with a rotary motion so as to create like pressure upon upper and lower teeth at the same time. If the bite was correctly taken and the casts correctly mounted in the articulator, the occlusion in the mouth should test perfect, but even if occlusion is perfect it is no evidence that the teeth will articulate correctly. We must make similar tests in each of the three movements of the jaw, viz.: to the right, left, and forward.

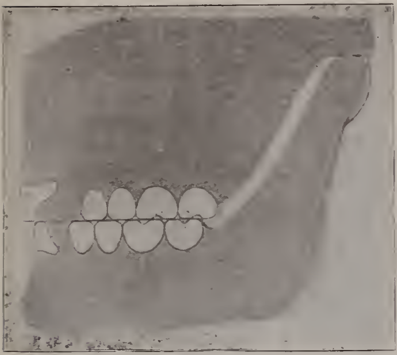

Fig. 13.

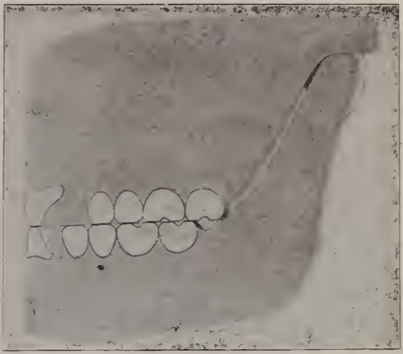

Fig. 14.

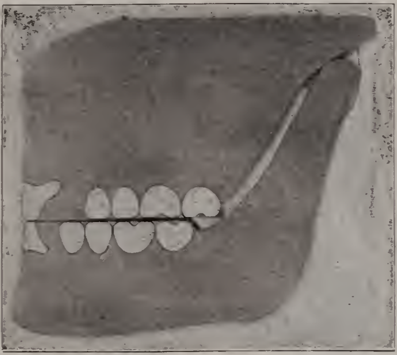

Fig. 15.

Figures 13 and 14 show occlusion and articulation of the system of "flat plane occlusion" when in a Bonwill articulator. Fig. 15 shows the same in the mouth when the jaw has been protruded so as to have the incisors meet on edge, showing incisal contact only. This illustrates also that curvature in the occlusal line is not governed alone by the over-bite of the incisors, else the molars would be in occlusal contact, there being no over-bite of the incisors in this case; in other words, curvature in the occlusal line is neccessary even though there be no over-bite of the incisors, if the condyloid-path is inclined, unless the entire occlusal line is placed at the same inclination as the condyloid-path, which it would be possible to do in an articulator, but which it is rarely possible to do in the mouth when there is much inclination of the condyloid-path.

When the jaw has been moved to the right, there should be occlusal contact upon both right and left sides, which is determined by the use of the spatula as just explained in testing occlusion; in this movement all of the teeth upon the right side should be in contact, while only the molars will be in contact upon the left side.

If it is found, however, that there is contact upon the right side only in this movement, it indicates that the buccal and lingual cusps upon the left sides are too nearly on the same level. This may be corrected by giving a little more inclination of the occlusal surfaces of the lower teeth toward the tongue, while the uppers must be inclined more toward the cheek, in this way changing the

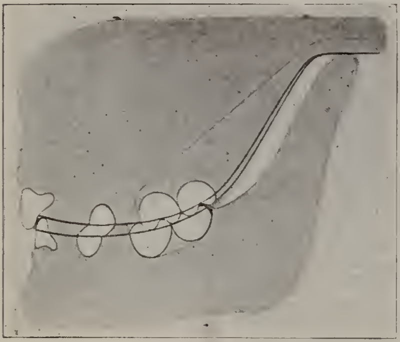

Fig. 16.

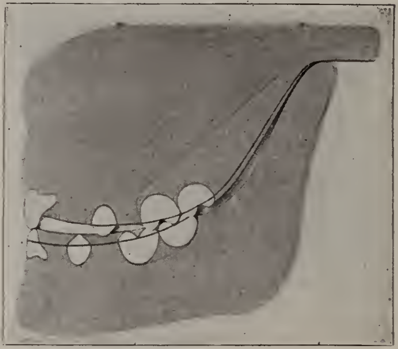

Fig. 17.

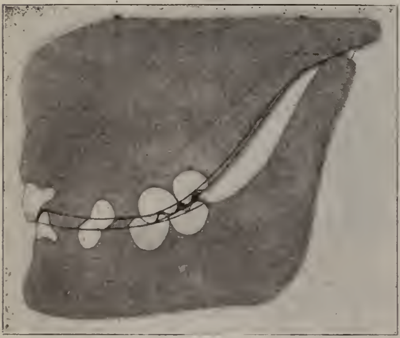

Fig. 18.

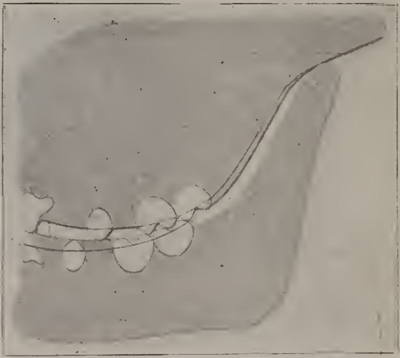

Fig. 19.

Figures 16 and 17 show a Bonwill articulation in a Bonwill articulator. Figures 18 and 19 show the same in the mouth. Fig 18 shows normal occlusion in the mouth to be correct, but Fig 19 showing the jaw protruded so that the incisors meet, shows that there is incisal contact only; it will be seen that the distal cusp of the lower second molar does not come up to the line drawn through the upper molars as in Fig. 17.

relative levels—increasing the difference in level—of the buccal and lingual cusps. We might say too, that changing the inclination of the occlusal surfaces as just stated—lower toward the tongue, upper toward the cheek—has the effect of making the buccal cusps longer than the lingual of the lower teeth, and the opposite effect in the upper teeth (see Fig. 8).

When the jaw has been moved to the right as just stated, we find on the left side that the buccal cusps of the lower teeth oppose the lingual cusps of the upper. Bear in mind now, that the buccal cusps of the lower being longer than the lingual, and in the upper it is the lingual cusps that are the longer, we have in the position of the jaw as just stated—jaw moved to the right—on the left side the long buccal cusps of the lower opposing the long lingual cusps of the upper, and in this way we compensate for the lowering of the jaw upon the left side as occurs in the movement just stated, due to the inclination of the condyloid-path (Figs. 8 and 9). It is in this way we are enabled to maintain occlusal contact when the jaw lowers or moves downward at the same time that it moves sidewise, which would be utterly impossible to accomplish with the cusps placed in a level plane.

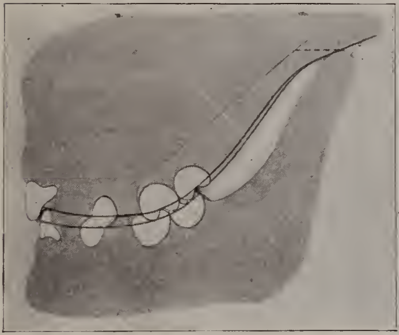

Fig. 20.

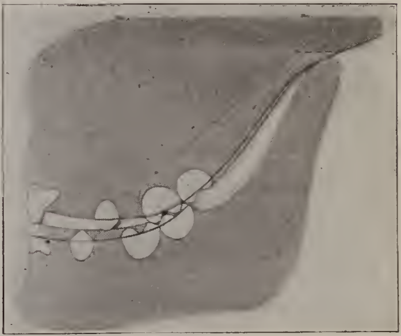

Fig. 21.

Figures 20 and 21 show articulation in a modified Bonwill articulator, and when placed in the mouth the results will be the same providing the inclination of the condyloid-path is the same as that of the articulator. Should the condyloid-path in the patient be greater inclined, there would have to be greater curvature in the occlusal line than here shown. On the other hand, should there be less inclination of the condyloid-path in the patient, there would have to be less curvature in the occlusal line than here shown.

If it is found in this same movement of the jaw—jaw moved to the right—that there is occlusal contact upon the left side only, it indicates that the difference in the level of the buccal and lingual cusps (or the difference in the length of these cusps) upon the left side is too great; in other words, the lower buccal and the upper lingual cusps are now too long, they are more than compensating for the lowering of the jaw upon the left side, resulting in a separation of the teeth upon the right side. The remedy lies in shortening the buccal cusps of the lower and the lingual cusps of the upper, upon the left side. This as previously stated, may be done by inclination of the occlusal surface, the greater the inclination the greater the difference in the length of the cusps, and vice versa.

When the jaw is moved to the left, the same tests are made and correction likewise, only now the corrections are made upon the right side. It will be noticed that the corrections are made upon the side where the jaw has been lowered, or moved downward in addition to the side movement. It should also be borne in mind that these tests for occlusal contact in the various movements of the jaw must always be made with a spatula forced sufficiently between the teeth and given a rotary motion to create like pressure upon upper and lower teeth.

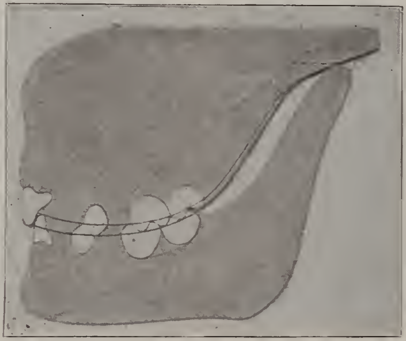

Fig. 22.

This illustrates th difference in curvature of the occlusal line when the condyloid-path is inclined and on a level plane, the over-bite being the same in each case; showing that the over-bite of the incisors does not alone affect the curvature required in the occlsual line. The line passing through the upper molars represents the curvature neccessary when the condyloid-path is inclined, and the line passing through the lower molars represents the curvature necessary when the condyloid-path is not inclined. From this it can readily be understood that curvature in the occlusal may be necessary even though there be no over-bite of the incisors. In Fig. 15 had there been a proper curvature in the occlusal line, molar contact would have been maintained with incisal contact.

We have yet to test the forward movement of the jaw. In this movement we should find occlusal contact on the incisal edges and the second molars. If we find contact on the incisal edges alone it indicates that there is not sufficient curvative in the occlusal line; and if there is no incisal contact when the jaw has been protruded for the same, it indicates that there is too much curvature

Nearly every school of dentistry inaugurated since the days of Harris, up to the present time, with but few exceptions in America at least, have been and still are proprietary colleges. In nearly all of them the majority of the faculties are composed of private practitioners of dentistry. Many of these are competent men, who have the welfare of their profession at heart. When we think of the facilities they command with which to teach their chosen subjects, of the sacrifices many of them have made, and of the trials with which they have to contend a feeling of just pride must overtake us. Many of you present this evening remember the curriculum of the ungraded two years' course, with its repetition of the lectures from each chair for two short terms of five months each. Compare these with the methods and requirements of today and you will immediately admit that a marvelous progress has been made; always considering of course that they still are proprietary colleges, the only source of income being the students' tuition fees, and in a few instances the clinics netting a small profit.

Not only have these colleges made advances but the profession in general as well, so that the dentistry of today is far in advance of the dentistry a few decades ago. This marvelous advance in the status of our knowledge has opened up vistas that will require every possible effort and facility to explore them; nay, more, it will require the best men the profession has to offer. And so we may ask, will the proprietary college, with its limited income and facilities continue to exist, or has its period of usefulness closed? Who shall say?

It is obvious that the extension of the course to four years and the synchronous enlargement of the curriculum from a merely practical one to one of much broader scope, entails an enormous increase in the cost of teaching in all colleges that will meet this very desirable change conscientiously. It is universally conceded by all capable educators in the professional schools, that it would be best if the underlying sciences of any of the professions be taught by "men who have chosen them as their life-work." "The kind of instruction which has to be given makes large demands upon the teacher's time, indeed a conscientious teacher of one of the fundamental sciences in a department of a university sometimes finds it difficult to get a sufficient amount of time to undertake research. Thus it has gradually come to pass that, in the better medical schools, those who teach such subjects as anatomy, physiology, pathology, and bacteriology, chemistry, and pharmacology upon a true university basis, no longer engage in the practice of medicine, but devote all of their time and strength to the teaching and investigation of the sciences which they represent."

In going over the list of colleges that are teaching dentistry in the United States today, we find that only a few are what might be termed "semi-university schools" for the majority of the proprietary colleges that claim university connection are strictly speaking pseudo-university schools;" and of "real-university schools" there are none. It must be admitted too that the majority of these colleges of the present are not ideal seats of dental education. This, however, seems quite natural to any one who is acquainted with the evolution of both the educational and scientific phases of dentistry. May we hope then that with the ushering in of the four years' graded course the "true-university" dental department will become a reality? Will the colleges take advantage of the opportunity—that is at hand? It seems to me that most of the dental schools of America which have no affiliation with richly endowed universities are facing a crisis. They have come to that parting of the ways when a change for the better seems inevitable, if they would survive. This is a most vital question and necessarily concerns the entire profession, for a true-university dental department will be a "center of original research as well as a place of instruction." As Dr. Barker has truly said—"An institution which attempts no more than the imparting of knowledge already acquired, is not worthy of the name of university. It is merely a college or seminary. A true university is made up of a group of scholars who are not only familiar with the results of previous investigations, but who, endowed with unusual capacities and skilled in the methodology of their respective sciences, invade new territories, searching diligently for new facts. Each scholar works for the sake of truth in his own department. He may not be too regardful of the compatibility of a new fact with the pre-conceived ideas held by himself or by others. He must have a profound belief in the ultimate value of truth, no matter how unpalatable it may seem to those who live at the time it is found out. Each leader in a department of a true-university is both a teacher and an investigator. The really great teachers have always been investigators—the really great investigators have always been teachers, though not always, perhaps, of large groups of students, nor always, it must be admitted, in their own generation. It is highly desirable that the two faculties of teaching and discovering be combined in every university professor. I am convinced that the influence, for any considerable length of time, of a non-investigating teacher cannot fail to be actually harmful to a student. The student may possibly acquire large stores of information, but he will not make progress in independent work, or in independent thought; indeed, his powers in this direction will be inhibited in time, if not wholly obliterated. No less pernicious to the student would be the effect of an investigator whose personality is repellant and non-sympathetic, and who has little or no capacity to interest students in his subjects, to inspire their enthusiasm for work, or to train them in accurate observation, sound reasoning and vivid imagination."

"It is generally taken for granted that in the philosophical faculty of a university, a professor shall give the whole of his time and all of his strength (aside from necessary recreation) to work for the university, The professor of economics does not give a part of his time to the university and the other part to the financing of city banks. Nor would the university retain as its professor of chemistry one who divided his time between the university laboratory on the one hand and a factory for the preparation of aniline dyes, or a huge establishment for the manufacture of drugs in a commercial way on the other."

"Imagine the condition which would exist if the university said to its professor of economics, "We shall be glad to have you as our professor of this subject provided you are willing to do the teaching we ask of you without direct remuneration. Your position in the university will make you so well and favorably known that you will be able to secure financial responsibilities in the city which will give you a far larger income than we could afford to pay you." Or, if the president and trustees made a proposition to the professor of chemistry that he be paid $1,500 per year to take charge of the teaching and investigation in the chemical laboratories, it being pointed out to him that the prestige of a university professorship would enable him to secure lucrative positions as commercial chemist to four or five manufacturing concerns in the city in which he lives, or as analyst to baking-powder companies and manufacturers of pure food preparations, some of the trustees taking the stand that the intimate contact thus gained with chemistry practically applied in the business world is not only desirable for the professor but absolutely essential in order that his influence upon his students may not be too academic! Which think you, the university interests or the other interests, would get the lion's share of the time and energy of these professors especially if they happen to have families with tastes as expensive as those of the average American family of the better class? What think you would be the rate of progress in original work in the sciences of political economy and chemistry in a university so constituted? And yet there is not a medical faculty, in a university anywhere in America, where this plan is not followed, at least for some of the chairs." The same is true of all our dental colleges. "Until this is wholly changed, we can scarcely hope for the disappearance of that opprobrium which, it cannot be denied, attaches to all so-called professional faculties of our universities. Until a new regime is entered upon we must, for these faculties, fain be content with work less in quantity and poorer in quality than is consistent with the ideals and dignity of a true university."

Such in brief then are the characteristics of a true university, and this should be applicable to all departments. We noted above that most of the dental schools were proprietary colleges, with faculties composed largely of private practitioners, and it is rumored that private practices pay better than professorships. Is it any wonder then that most of them fail in the achievement of the noble aims which should always characterize a school of professional learning? We may say that the ideal university dental department is an impossibility at this time; but what will the faculties do with the four years' course? Surely we can not fill up the additional year with mere repetitions.

Every sincere and conscientious dental teacher, who is moved by a noble ambition, knows full well that it would be far better for dentistry if we had fewer schools and better schools. And if these would have the proper support they might practice the advice of Prof. Huxley, by notifying every student who would show evidences of inability during the first and second year, to abandon the course.

President Gillman in an address before the alumni association of Harvard, speaking of the characteristics of a true university, said: "I do not speak of genius which takes care of itself. Nobody can tell how it comes to pass that men of extraordinary minds are born of common-place parentage and bred in schools of adversity away from books and masters. Institutions are not essential to their education. But every one who observes in a series of years the advancement of men of talents, as distinguished from men of genius, must believe that the fostering diet of a university—'its plain living and high thinking'—favors the growth of scholars, investigators, reasoners, orators, statesmen of enduring reputation, poets and discoverers. Such men are rarely produced in the freedom of the wilderness, in the publicity of travel and of trade, are in the seclusion of private life; they are not the natural product of libraries and museums, when these stand apart from universities; they are rarely produced by schools of lower grade. Exceptions are familiar, but the history of civilization declares that promising youth should have the most favorable opportunities for intercourse with other minds, living as well as dead, comrades as well as teachers, governors as well as friends. It declares that in most instances talents will seize opportunity and opportunity will help talents."

And now in conclusion allow me to offer a few suggestions as to the teaching of orthodontia in the true university dental department of the future, when it will be taught as a science, by men who choose it's teaching as their life-work, and who will be willing to forego many of the "delights of life" or the allurements of the commercialism of modern civilization. Then will it receive that attention it so justly merits.

The course should begin in the third or junior year with a brief yet thorough review of the underlying sciences, e. g., embryology, anatomy, etc., and a thorough course in comparative dental anatomy. The lecturer on this most important subject should have access to a complete museum. Another feature of the junior year would be a complete course in the technique, preparatory to the practical work in the clinic during the senior year and in after practice. With the proper facilities a competent teacher can make this course exceedingly interesting and he should embrace in it the technique of all of the best and most approved methods of treatment.

In the senior year a thorough course of lectures should be given on the practice of orthodontia, supplemented by clinical lectures and demonstrations. The clinical work should be under the strictest supervision and utilized for the advancement of the science whenever that would seem possible or desirable. Researches would be conducted by the head of this department and students showing special interest in this science would be encouraged to practice it as a specialty; for in the centers of wealth and population it should and no doubt always will be practiced as a distinct specialty of dentistry by men who possess unusual talent. Such allied subjects as rhinology, etc., should also receive a thorough consideration. The course in the junior year would be obligatory; whilst that of the senior year optional, its main purpose being the encouragement of research and the training of specialists. The student who then decides upon the general practice of dentistry, after having satisfactorily completed the work of the third year, embracing as it does all of the essentials, would be far in advance of the man who had never studied the science. The grave errors which are to this day committed by thousands of practitioners would then be a matter of history. The graduate of such a school, even though he locate in a small city, will possess that broad and liberal training so essential to the successful practice of his art.

In the spare hours of his limited practice he could render a great and noble service to suffering humanity, by offering his ability and skill to those poor unfortunates to whom the specialist never smiles.

A recent writer has truly said that in the past "mankind had the faculty of ignoring its benefactors that amounted almost to a genius." Let us hope that in the future philanthropists as well as states will be more anxious to endow the real benefactors of the race and more unwilling to favor the "traditional learning."

Will the ideal and true university dental department prevail in the future? Ultimately, yes.

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PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

A regular meeting was held April 7, 1903, with Dr. Elgin MaWhinney in the Chair.

Dr. Ashley M. Hewett read a paper on "Electricity in the Dental Office."

DISCUSSION.

DR. WILLIAM H. TAGGART:

I hardly know how to begin to discuss this paper, because it is so full of plain facts and scientific truths that there is no other side to the subject. It is all just as Dr. Hewett has said. My talk will possibly be of a rambling nature, and I may cover a great deal that he has said, but in so doing I hope to be able to present the picture in a little different light from what he has done; not that I am able to make it clearer than he did.

In reference to the advantages and disadvantages of rheostats, I have always claimed that in the use of an elctric furnace a rheostat is of no use as far as protecting the furnace is concerned. By throwing the current in gradually, you protect the wire and bring the heat up more gradually, consequently there is less strain on the wire. That can be explained in this way. When a wire is cold, it is capable of taking a great deal of current. If the furnace has thirteen feet of platinum wire, when it is cold, and the current is first turned into it, nine amperes will go through it. As soon as it gets hot, its carrying capacity is decreased, and it will possibly take four or at least three and a half amperes, showing that the wire itself is capable of acting as a rheostat and in that way protecting itself. Even though the heat is drawn through the wire suddenly, it cannot get hotter than its surrounding medium, which is the fire clay that embeds it. That protects the wire from getting absolutely to an incandescent heat. This can be illustrated, and would be an interesting experiment to perform. Take a piece of platinum or iron wire, loop it backward and forward, place it on the soldering block, throw the blow-pipe flame on it, and parts of the wire in contact with the soldering pad will get to a very white heat. The parts are in absolute contact with something, showing that the heat is conducted away at that point, while other parts will remain at a dull red heat. In this way the surrounding medium will protect the wire from becoming too hot. If that is so, the same principle in cutting off the current holds good. Dr. Hewett has told us that it is not advisable to cut off the current suddenly, because of the great strain on the wire. If the current is cut off suddenly from the wire the heat is taken away from it immediately. The turning on and turning off of an electric current is not as much of a strain on the wire as a great many are led to believe.

Most of the furnaces are constructed by having a loop or a wire which is embedded in the fire clay or on the surface of it, consequently in some places you will notice that the wire is exposed; in other places it is covered by the thinnest kind of film. In still other places the wire is out of sight. When the current is drawn through the wire, the parts are exposed to the air and become hotter. They go up to a rapid incandescence; while the deeper parts, those embedded in the fire-clay, remain at a dull red heat, consequently the part that is heated up to a high incandescence has no physical need to take the current so rapidly, and as easily as it is when it is cold. The different loops exposed in that way are not in a physical condition to stand as much current in passing through them. In other words, it would be similar to forcing the same amount of current through a private wire. This cold end of the loop is capable of taking on current, and the current going through it without heating it unduly. The part exposed is taking the same amount of current, but is less able to take it because it is high. The furnaces that have the loop exposed in this way are more apt to burn out than the one Dr. Hewett spoke of. where the wire is wound around the muffle, and the wire is in absolute contact with something all the time. It has a conducting medium all around it.

There is one feature that he did not allude to in his paper, namely, the advantages of a furnace that has a muffle, and one that has the wires lying exposed or nearly so. There is a change in color from the oxidation of the platinum. Edison, in his first experiments with incandescent light, used platinum wire in a vacuum, and that would throw off the oxide of platinum, and as this was given off, the caliber of the wire became smaller and smaller, consequently it was heated to any degree of incandescence one might wish. It went beyond its capacity and shortly burned out. Take a furnace that has partially exposed loops and parts that are embedded. The part exposed throws off oxide of platinum, and that part of the wire gradually becomes smaller and smaller, but the dynamo back of it tries to force the same quantity of electricity through the wire of smaller caliber, consequently the loop will burn out. On the same line I would advise you never to buy a second-hand furnace, because it is like the one-horse shay, when it begins to break it is ready to break all along the line. Second-hand furnaces cannot be entrusted to carry the current.

I would like to say a few words in regard to the danger of kinks in the wire. A kink in the wire weakens it, whether electricity is put through it or not. The fact that a kink in a wire is the easiest place at which it is broken shows it is very weak at that point, and it might not be able to carry the same amount of current. The merest kind of scratch with a sharp metallic instrument would reduce its caliber, and its ability to carry the same amount of current, consequently at that point there would be danger of the wire burning out. Occasionally, one will get a furnace that will last a long time, because of these physical conditions having been carefully taken care of. The next furnace one gets, someone in winding the wire may give it a little kink, as he is apt to do in unrolling it, and thus reduce its caliber, so that at that particular point the wire will break easily.

In cleaning a furnace it should be done with wooden sticks. A metallic instrument should not be used to press down the coils.

At one time, before the days of electricity, when muffles were breaking and gases were escaping, it occurred to me, as it doubtless did to others, to make a platinum muffle, which would prevent the gases from going through the fine grained metal. While this muffle cost me $52.00, it heated readily and rapidly; it baked porcelain nicely with the exception of the color. I could not bake a continuous gum case in this platinum muffle on account of the oxide of platinum thrown on it.

Referring to the Custer zig-zag winding, this was adopted by

Dr. Custer more with the idea of protecting the wire from physical harm than from taking care of the counter electro-motive action, the reason being that where loops are used there is not so much strain put on the wire as if one held a long wire in pulling it. It divides it up into sections. This principle was used in the old Carpenter rheostat, an instrument gotten out long before the days of furnaces. We never expect wire to get up to any such degree of heat as will endanger its physical properties. And so it was done more for the protection of the wire in expanding and contracting than for any other purpose.

Referring to the advice given of having young men get electro-motors in their offices and having electricity distributed through the offices, it is excellent. I would advise every young dentist to do so. My idea has never been to recommend to any young man, going into a mechanical pursuit, to go back to the first principles of learning how to make his materials. It is well enough for him to have and to know the theory as to how they are made. Nowadays, we do not expect a carpenter to go into the woods, hew his own tree, saw it up into boards, make a house and finish it. It is a waste of time. Ever since I have been in the dental profession my idea in the handling of tools has been to get the newest and most modern tools in use, keeping fully in touch with these things, and I have yet to see the time when I have found it necessary to go back to the older methods. For instance, first it was the hand excavator. Dentists will learn enough of the use of that instrument in the exigencies of practice from day to day without trying to become experts with it. Then came the foot engine. Dentists tried to become experts with it. Then the electric motor was introduced, and one never wants to go back to the foot engine again if he can help it. If he does, it will be such a long interval that he will have practically to learn it all over. There is very little advantage for young men in learning old things and methods, because a great many of the old dentists used to do it. For that reason, I would advise the young men in dentistry to get electric motors; try to handle their cases without the foot engine or the hand excavator. Practitioners who used the foot engine or hand excavator may recommend young dentists not to get electric motors. The practice of dentistry is hard enough with all our modern appliances and instruments that we can command. Patients are willing to pay for these things. We have to make them pay for them.

Dr. L. H. Arnold:

There are objections to either inside or outside winding of muffles. An inside winding is subject to short circuiting or burning out by contact of instruments or other metal, and to adhesion between trays and wires on the muffle floor. However, these defects may be remedied by carefully covering the wires and keeping cracks well stopped and by having the covering a little heavier on the bottom, and then we get the greatest effectiveness with the least strain on the wires. Outside wound furnaces carry the wires in grooves, and as the essayist said, if the grooves are narrower than the diameter of the wire, the wire will be held at a distance from the muffle wall and great waste of heat occur. Granting a proper groove and wire in good contact with the muffle walls, we have still the non-conducting walls interposed between the source of heat and object to be heated, and consequently great loss of heat.

Again, platinum wire increases in length very materially when heated, and gravity, holding the wire down on top of the muffle, drags it away from the bottom to the full extent of the stretching, thereby interposing an air space, also a bad conductor, between the muffle walls and the source of heat, making double insulation between the source of heat and the work, thus greatly decreasing the effectiveness of the furnace and (because of greater heat necessary in the wires) its durability.

All things considered, I believe the inside winding to be more logical, and in practice I have found it more durable. "Platinum does not oxidize in the open air at any temperature."—Century Dictionary and Cyclopedia.

Dr. Hewett (closing the discussion):

I promised, when I started out, not to bore you with any figures. What Dr. Taggart said about the amount of current, when the furnace starts up, in comparison with the amount when hot, is absolutely true. When you first turn on the current, the furnace takes a great deal more electricity or current than it does after it becomes heated. It takes about 70 per cent as much current when the furnace is heated as when it is cold.

Here are some Wattmeter readings taken at every quarter minute for an hour on several different makes of furnaces. The figures are:

	Cold Furnace	1500° F.	2500° F.
1st furnace	840 Watts	688 Watts	653 Watts.
2d furnace	910 Watts	759 Watts	705 Watts.
3d furnace	830 Watts	605 Watts	585 Watts.

You will note from the above figures that furnaces take about 70½ per cent as much current when hot as when cold.

There are some furnaces on the market, marked four amperes. Some of the furnaces we tested took as high as eight, nine, and ten amperes of current to start with, and you can readily understand how a furnace that will take nine amperes, will readily burn out a five-ampere fuse (a ten-ampere fuse should always be used).

I am very glad Dr. Arnold spoke about the muffle. That is a point I did not bring out clearly. In regard to the sagging of the wire; that the wire gets a little longer, to obviate that, in the furnace there should be some finely burnt ashes packed around in the grooves to keep the wire down in its place. As the muffle and wire both expand when heated, there will not be a large loop of wire. It might be wound too loosely, and in that way would make a loop, but ordinarily it does not. He has evidently gotten that point mixed with the idea of a choke coil. In a choke or spark coil, the extra current is induced, when the circuit is opened, but not in the straight wire. That is due to the magnetic force in the coil. Where we have a spark coil, there will be a rebound of current, but not in a straight winding of comparatively few turns. At least we have not found that, besides the effect that Dr. Arnold spoke of does not take place at all. But I am glad the point was brought up.

There is only one other point that I wish to refer to, that is, the furnace must be easily repaired. We must be able to take out these wires, repair them, and replace them, and while there is a certain disadvantage in having the wire on the outside of the muffle, yet there are certain distinct advantages which greatly outweigh the feature of having the wire on the inside of the muffle, especially when you spill a little feldspar in the muffle, you do not want it to come in contact with the wire, as it may stick and when you take out the work it will pull the wire out longer, and make it smaller, then where it is smaller there is more resistance and it burns out first. I thank you.

Dr. Hart J. Goslee presented a report of the Committee on Exhibits and New Appliances. Among other things, he showed an improved crown and bridge articulator, designed by the Blue Island Dental Specialty Company, a pressure anesthesia instrument, designed by Dr. R. B. Tuller; Dr. Hewett's new amalgam mixer; a device recently invented by Dr. F. E. Roach for the purpose of securing a fulcrum in the manipulation of enamel cleavers in the preparation of roots; Fahey's crown holder, designed for holding crowns while polishing; Dr. Brewer's riveting forceps for repairing broken facings on crowns and bridges; new porcelain "bodies" for crown and bridgework; a pair of matrix pliers for inlay work; Angle's ligature wire; Devoe's pyorrhea remedy; variation of shades in base-plate vulcanite rubbers; flexible spatula designed for proximal work in the posterior part of the mouth, etc., by the L. S. White Co.

Mr. F. K. Camp demonstrated the use of a simple X-ray apparatus.

ODONTOGRAPHIC SOCIETY OF CHICAGO.

Fifteenth Anniversary Celebration, February, 1903.

Discussion on the Paper of Dr. Ottolengui.

Dr. W. A. Capon, of Philadelphia, Pa.:

Mr. President:

I think it is extremely unfortunate that I am the one chosen to open the discussion on this paper. While I am a busy and willing worker, I am not very much of a talker. I feel very positive in regard to some points in connection with porcelain work, the same as the essayist does, but if I am not able to convey to you my ideas through lack of ability as a speaker, you will pardon me. At any rate, you will understand that I am in earnest.

I congratulate Dr. Ottolengui on having produced the most debatable paper on porcelain I have ever heard. It is only in the last few years that we have had papers and discussions on porcelain. Ten years ago papers on this subject were discussed very little, or not at all. By many the subject was not considered worth discussion. There was not enough merit in it, but at present time papers on the subject are being read quite frequently, and are freely discussed. Therefore, I congratulate the essayist on his temerity in making the assertions that he has before the greatest meeting of porcelain workers that ever came together, and especially so in this city of Chicago, the greatest porcelain city in the world. (Applause.)

I have another congratulation for him, and in doing so I hope I may be allowed to quote some statement made by Dr. Ottolengui, taken from his book on the methods of filling teeth, which was written twelve years ago.

"Porcelain fillings, so-called, are pieces of tooth porcelain especially baked to fit a given cavity, and are then retained by cement. Hence it is obvious that the durability of such an operation depends upon the cement, which cannot be counter permanent, though more nearly so here than when used alone. The only excuse for using porcelain is the matching of the teeth in color. This is only accomplished by accident. The color of a given mixture will depend upon the degree of heat at which fusion occurs, and as this cannot be definitely measured, it becomes impossible to produce the desired shade. These are enough to make the method disappointing, if not worthless. Porcelain inlays are different, in that the filling is made from porcelain already baked, so that the color and shade may be selected to match, if sufficient variety be at hand. Up to the present time, inlays have been successful for only a small number of cases. If a method should be devised by which porcelain can be accurately ground to fit a peculiarly shaped cavity, there will be many places where an inlay will be indicated, notably on the labial surfaces of superior incisors of all kinds. Of the fillings, however, more will depend upon the cement for retention than the cavity, and I am inclined to believe that only temporary results will be obtained."

In those few words he has changed from one side to the other, and I welcome him publicly as being in the ranks of porcelain workers, one far more enthusiastic than I am, but still his enthusiasm is misplaced.

In the article I have just read from, he says, first of all, that porcelain is for appearance; he has not much use for it for the preservation of teeth. He has changed. Now, he says appearance is secondary, and that, first of all, the preservation of the teeth is the essential factor. Those are things he claimed many years ago. We had the courage of our convictions, but we had very few to brace our shoulders and give us such encouragement. Such an article, quotations from which I have read, made it hard for those of us who were trying to make reputations, and felt we could do so with porcelain work. That article was read in every one of our Philadelphia dental colleges, and as soon as one of our professors had read it, he said, "Poor Capon, poor Capon!" That was twelve years ago and I am here yet.

The essayist makes a special point in regard to the layer of cement between the filling and the tooth, and claims that with a gold matrix we get a better adaptation of the filling to the tooth substance than with platinum. It matters very little whether there is a thin or a thick layer up to a certain point. I ask you as dentists who have lined cavities with cement (if you have not, you should), does it make so much difference about the form of the lining so long as the cavity margins are perfectly protected?

As to the replacing of high fusing inlays, I would like to know if it ever occurred to you there were never any low fusing fillings that were replaced. He says the inlays are merely pasted in the mouth. The man who merely pastes a porcelain filling in the mouth, whether he uses a high or low fusing body, does not deserve to have a following.

The essayist says: "If I get satisfactory results with the Jenkins' material; if I can fill my cavity with it, it seems, in my judgment, to require it. If I can match colors, I am satisfied. If I can get retaining strength, I make the cavities deep."

I have read what Dr. Ottolengui has written and published, because you can readily see how easy it is for us, who oppose the essayist in this class of work, simply to place there a high fusing material instead of Jenkins' body. We have a greater right to do it, because we have given it a test for years. We have used it twice the length of time the Jenkins' method has been in existence. If we find the same use for our material that he finds for his, and have put it to practical use a great deal longer, why should we change? He says he has never seen any high fusing material equal to the Jenkins'. There are none so blind as those who will not see.

Dr. Ottolengui:

But I have glasses on.

Dr. Capon:

Yes; but the trouble is you have Jenkins in each glass. The essayist claims Jenkins' method is shorter. We claim that for our method, and we have priority of claim.

The essayist speaks also of a loss of the distal corner of a central being replaced by the Jenkins' material in a much more satisfactory manner. That is not fair. It may have been done by chance, and it is only a case of poor judgment, on the one hand, and better judgment by the other man, that is all.

So far as sections of central teeth being in the experimental stage is concerned, that is a mistake.

Dr. Ottolengui:

Molars.

Dr. Capon:

Your paper does not state that.

Dr. Ottolengui:

Yes, it does.

Dr. Capon:

Sections of bicuspids and molars are, to a great extent, experimental. I admit that. So far as centrals are concerned, anywhere in the front part of the mouth, that is where we poor high fusing fellows have made our records. I, for one, would like to know what is the experimental stage. Is it four, five, ten, or fifteen years? I think anything that has stood such a test as we have given it for the last ten or fifteen years—and patients have returned to my office with inlays looking better than when they were put in—is pretty near beyond the experimental stage. We have not had such a terrible time in getting shades, although we only had half a dozen to select from. As it was, we relied on Close's body for most of our work. It was not such a difficult thing. A great deal depends on the person using the material. If we could get anywhere near the good results we did so many years ago, how much easier it is for us to get better results now, when we have so many and better facilities for doing the work. We have only to think of something and it is ready for us at the present time.

As to a slight variation in shade without detriment to quality, that is applicable to a low, as well as to a high, fusing material, for it takes a slight change of shade before there is a detriment in the material, and the chances are very much greater of making a slight change in both the shade and quality in a lower than in a higher fusing material. There is no doubt about that.

There is an old Biblical saying to the effect, "Prove all things, and hold fast to that which is good." It is certainly not applicable to the essayist. He has proved nothing, and he holds fast to what is yet experimental. But there is one thing I agree with him, and that is with the rational use of porcelain.

Dr. R. Ottolengui, of New York:

It would seem that I am alone in this discussion. Instead of answering all the points in closing the discussion, I am going to ask the privilege of making a one or two minute discussion after each speaker, so as not to forget anything.

It is obvious that the durability of such inlay operations depends upon the cement, which cannot be considered permanent. The only excuse for using porcelain is to match the teeth and color. Such a statement I made at that time, and I repeat it again now. What is the use of the work if you do not match the color? I say the color of a given mixture depends upon the degree of heat, and this cannot be definitely measured with the pyrometer. There is a different fusing point for gold and there is a different fusing point for the other materials. Gold fuses at a certain point. I do not know anything about pyrometers, but the degree of heat cannot be definitely measured, and has not been measured.

Dr. William T. Reeves, of Chicago:

I wish I had had the chance to read Dr. Ottolengui's paper previous to hearing it, in order that I might have prepared my discussion, but I am afraid that I would have inflicted on you as long a discussion as the paper, because there are so many points with which I disagree. Unfortunately, I am quite positive in my views, and in all I have written I have never had a string tied to it. What I have said was based on actual experience, extending over ten years. There is a great deal I endorse in Dr. Ottolengui's paper. He quoted from several papers of the high fusing men. Either Dr. Ottolengui has not read any of the papers I have written, and which have been recently published, or he has intentionally failed to quote what I have said. I believe with him that all inlays can be extended to the depth of the cavity; that there should be no appreciable amount of cement in any portion between the inlay and cavity, but I go further than that, and, while he did not mention it in his paper, he has had to prepare a groove for retention. I think the amount of cement he has in his grooves is detrimental and entirely unnecessary, as far as retention is concerned.

The retention of inlays in cavities depends on depth, and I do not know but what I am the only high fusing man who takes that position. There is a different law of physics in connection with inlays from that observed in connection with all other filling materials we use today.

One of the strong points the essayist makes is in connection with the use of Jenkins' bodies, which, of course, we class as low fusing bodies, because a distinction is made between bodies that fuse above the melting point of gold and those that fuse below the melting point of gold.

In the first paper I ever prepared and read before the Chicago Dental Society, I said there was a misuse of the word inlays in connection with the work of porcelain for filling teeth, and that they properly might be termed restorers, because we were making fillings and not inlays, and it is the one great feature in porcelain that you can carry it to the depth of the cavity and protect the pulp to an absolute certainty. This you cannot do with a cement filling.

I take issue with high fusing men who do not carry matrices to the bottom of cavities, and who leave an appreciable amount of cement for pulp protection. We have demonstrated in filling cavities here that platinum can be burnished to the depth of the deepest cavities. I find no trouble in doing so. I find no trouble to gain margins, and I can show Dr. Ottolengui cavities in the mouth in which gold cannot be withdrawn from them without distortion. The rigidity of the platinum enables you to handle these cases successfully.

He gave an illustration as regards warpage and passed around a compound cavity in a bicuspid as being of that form. He has a misconception in regard to the manner in which the contraction affects such an inlay. He said he had contraction of the matrix that he did not invest in plaster or asbestos. The contraction would not draw the cervical ends of the matrix together. There is nothing between these to contract, but between the cusps he would get contraction, and did get it.

In regard to the claim made by high fusing men that a matrix made of platinum, after having been baked, can be placed in the cavity again and re-burnished, I will say that it is as far back as 1896 since I went back to a cavity, no matter how complex, and re-burnished the matrix a second time, after having completed my burnishing. It is entirely unnecessary if a method is adopted to hold the matrix in the cavity with absolute fixity.

I advise the use of bodies in lines to obtain a translucent, natural-looking inlay. If you want to make a tooth look natural, match the tooth with a live color and a live-looking inlay, and I claim the only way to retain that effect is by having the light reflect through the overlying layer of neutral color which subdues or modifies it so as to show in the same manner as the dentine in the tooth shows through the enamel. In ninety-nine out of a hundred teeth the color of the enamel has practically the same variation, because of the difference in the dentine. Therefore, an inlay, in my mind, made on that principle, will produce a natural, life-like-looking inlay, and I do not believe that it can be accomplished with that even degree of color in matching with Jenkins body that we are able to do with a high fusing body working on that line. In speaking about this, we have to refer to the use of china-painting, as the essayist calls it. Oil colors cannot be used in thin enough degree to mix with water. It is only by mixing them with oil that they can be spread on thin enough to accomplish what we want. Thus, odd-colored teeth that have a blue tinge, just a line or two above the cutting edge, can be reproduced in an inlay with the use of dark bodies mixed in oil, but in no possible way can one handle it in such a manner with the Jenkins' body. Teeth that are tobacco-stained, showing cutting edges, or the abraded portions, can be reproduced with the dark colors, but this cannot be done with the Jenkins' body. That is why we make use in inlay work of oil colors. It is to produce those tinges that are so beautiful, which was impossible up to the time these colors were being introduced and put on the market.

Again, the essayist speaks of the possibilities of contouring with the Jenkins' body; that you can afterwards grind and polish it. Previous to stripping the matrix from the inlay, if you have enough material lapping on the tooth, to give you a full contour of the tooth, you can tell what your contour is and know to a certainty if there is an over-fullness of the inlay, because there has not been as much shrinkage as you figured on. You can grind it with a stone and then take it to the furnace and glaze again with a certainty that it will not change shape in being glazed the second time after the grinding. You cannot do that with Jenkins' body.

Dr. Ottolengui:

Yes, we can.

Dr. Reeves:

You have not shown it.

Dr. Fred J. Capon, of Toronto, Ontario:

I think the essayist should be congratulated on producing a paper that will bring together such a crowd as is assembled here this morning. I admire him for the courage he has displayed in coming here in the hot-bed of Western high-class porcelain workers and pressing his claims.

I hardly know what to say. I can not call him effeminate, though I think after all this discussion is over, he will be pretty much like a woman, for it is said,

"Convince a woman against her will,
She's of the same opinion still."

So it is not a matter of what we can do, but how to do it, and there is a good deal in the manipulator. We try to adopt the simplest means in doing things. We have the same ideas we had twelve or fifteen years ago, when I first began this work, and being of the same effeminate feeling, I have yet to see any good reasons why I should change. I burnished my matrix as far to the bottom of the cavity then as I do today, and I get the same results. I can show contour work of long-standing. I have learned in all these years that discrimination and judgment are the greatest factors we have in porcelain work. I am a gold worker, so to speak, and I have always held that it is my gold working faculties that have helped me out in my porcelain work. I have learned to discriminate where to use porcelain and where to use gold. In the controversy between porcelain workers, I am very much in the same box as Dr. Ottolengui. He has very little use for a high fusing body, and I have very little use for a low fusing body, except to experiment with it, and I have set it aside. I must admit the superiority of a high fusing body over that of the low fusing bodies on the market. In working with low grade bodies results are only obtained after three or four bakings, and the shrinkage is great.

When we come to look into the matter of strength, let us inquire as to the definition of porcelain. If you will look it up in your dictionaries, you will find that it is a glassy substance. What is glass? Glass is a vitreous mass. When you carry porcelain beyond a certain heat, it becomes vitreous; it becomes glass. Take a tooth of White's or Justi's, and if you push it above baking heat, that is required for what we call baking it, then it becomes glass, and loses much of its strength. If you look at some of the fine specimens of porcelain produced in France, Germany, and other places, you may ask the question, "Are they produced in glass?" No. There is no strength in glass. They are produced in fine leaves of porcelain, very strong and durable. In making up samples, the higher the grade of porcelain, the more strength we have in producing fine little lines. Therefore, I should say, from the standpoint of honest criticism, we have strength in porcelain which we have not in the glassy substance that is used in a low grade body.

Dr. Ottolengui:

If you take a Jenkins' body and make an edge on it, you can scratch a mark on a high fusing tooth with it.

Dr. Capon:

It is the different quality I am speaking about. Jenkins has a better quality in his material than the other men who produce glassy substances, and I congratulate him on his experiments. However, it is only a few years ago that Jenkins called in all of his first bodies. He was not satisfied with them, and it is only recently that Jenkins has had anything on the market he has been satisfied with. When we go back as far as ten, twelve or fifteen years we have something on our side.

I am glad also to see that Dr. Ottolengui is following out the principle that depth of cavity has something to do with the retention of small fillings, especially on the labial surfaces of teeth. I think he told me years ago that he had some difficulty in retaining fillings on the labial surfaces of teeth.

Dr. Ottolengui:

I said I could not keep them in.

Dr. Capon:

I explained that it must be due to depth of cavity required. If anyone makes a saucer-shaped cavity in a tooth and expects cement to hold the inlay in place by tenacity alone, it is only a matter of a short time before the tooth-brush will take the inlay from its cavity, and the result is another failure of porcelain. If you place gold under the same circumstances, you get the same result. On the labial surfaces of teeth, it is just as essential to have depth of cavity and parallel walls as it is to have them for gold. We want as much retention as possible for porcelain the same as for any other filling material. I take issue with Dr. Reeves in saying he believes that a closely burnished matrix holds the inlay by closeness of union. I think that statement is absurd. We must have something to retain it in position. If we have not depth of cavity, we must have something else. There is not enough tenacity about cement to hold a section that sticks seven-eighths out over a tooth and one-eighth under. It does not seem to me practical.

Dr. Wm. T. Reeves, of Chicago:

Reference has been made to the strength of the different porcelains. I think that phase of the subject might be dismissed from now on, as far as the consideration between high and low fusing porcelains is concerned. Low fusing porcelain of good quality and high fusing porcelain of good quality, either one of which has not been fused in fire, are strong enough for our purpose, and it makes no difference to me as to which is a little stronger.

We will consider a molar tooth with a crown cavity, which we have deepened sufficiently for an inlay to set in. The inlay may be so thin that you can fracture it between your fingers if you closed on it. It is so thin in some cases as to be a little risky in stripping your matrix. If such an inlay is used in a cavity and the cement is crystallized, you have the full strength of the tooth for the resistance of mastication. Provided you do not run up to a thin film at the point of occlusion, an inlay baked for such a cavity will resist all the stress of mastication any tooth will need be subjugated to.

The old saying, that the proof of the pudding is in the eating, will hold good in regard to what I have advanced as to the retention of inlays. Cement set under pressure is different from cement merely placed in the cavity without pressure. When you set an inlay and maintain pressure by some means or other, for at least thirty minutes, until you have passed the stage of expansion of the cement in crystallization, you have produced a condition which does hold. We have inlays that become dislodged, but we likewise have crowns that have to be set over again, and you do not think much about the necessity of occasionally setting a crown over again.

Dr. W. H. Taggart:

I have always felt in these discussions, that instead of discussing petty differences of opinion we should talk about underlying principles. Dr. Reeves said the proof of the pudding is in the eating. I think I can improve on that a little by saying that the proof of the pudding is not in chewing the rag. (Laughter.)

I do not wish to cast any reflections on any one of the other gentlemen, but Dr. Reeves took up Dr. Ottolengui on a simple thing by saying that you can grind and re-fuse a high fusing body, but you cannot do that with a Jenkins body. To me there is no sense in bringing up such a simple thing. That is not an underlying principle. There is no necessity of mentioning it. We all know it can be done with either one of them. Underlying principles are ignored many times, and men in discussing papers are ever anxious and waiting for the opportunity to pick up one another or to get the laugh on one another. That may seem one way of entertaining an audience of professional men after their strenuous life in the office all day long, but we want something more than that. We ought never to say too much for or against any proposition in dentistry, for the reason that we will have to take back so much next year. The man who vigorously condemns low fusing bodies will have a lot to take back next year, and the low fusing man who ridicules high fusing bodies will have more to take back next year. There are possibilities in either one. We have to admit that the extremists are the ones who bring out the good qualities of either, but there is a conservative ground we ought to take. Some of the most beautiful inlays I have ever made were made with Jenkins' bodies. I do not use Jenkins' body altogether. We older dentists remember the time when there was a great controversy over non-cohesive foils and cohesive foils. The same conditions will occur in regard to these two bodies. One has got possibilities in it that the other does not possess. There is no doubt in my mind that Jenkins' body has physical properties which make it suitable for use in certain small cavities.

The fact that it has not been used more than four or five years is no argument against it. We should strive to learn the possibilities of each one.

In relation to sealing porcelain in contact with the tooth substance, I think Dr. Reeves said he was the first one to advocate the actual contact of porcelain with the bottom of the cavity.

Dr. Reeves:

I beg pardon. I said I had always advocated it.

Dr. Taggart:

I will take that back, then. You said you were the one to put it in print, or you may in the heat of argument have used words a little differently from what you intended, but I think the impression was conveyed to the audience that that was so. I have mentioned these things, not for the purpose of criticising any man, but to show that there is a broad field for us in porcelain work, and that while we may claim credit for some of the little things, we ought to give credit to the men who have gone in advance of us. Think of the reputation Jenkins is getting on account of porcelain inlays. Where is Dr. Land mentioned? It is an underlying principle of porcelain fillings, that he used and applied in his work, and I sat under his instruction eighteen or twenty years ago. The only difference is that we have attained skill that Dr. Land did not have. But the underlying principle is still there, and the only men who are ever going to make porcelain fillings that will be right will be those who are disgusted with the ones that they made yesterday. A man has no business to make a porcelain filling unless he uses a magnifying glass. That has added an awful burden to my work in using the glass, and I sometimes wish to goodness there was no such a thing made. (Laughter.) But the fact is, gentlemen, it is made; I have got one; I use it, and it shows defects in my work that my eyes are never able to discover.

There is an underlying principle in the adaptation of metals to given surfaces. Whenever a metal is put into a cavity, in adapting it to a given surface, the burnisher has a tendency to roll the metal away, to stiffen it, and change its molecular relationship. When it is heated the molecules re-arrange themselves and there is warpage. To overcome this it should be repeatedly swaged and annealed till it lies dead soft on the die without the tendency to warp. The proper heat will not make it warp. I venture to say, that three-quarters of the porcelain inlays warp in the furnace, not because the porcelain clings to the platinum and drags it out of shape, but because the molecules in the platinum are trying to re-arrange themselves in proper form. This is an underlying principle that is worth something.

Dr. J. E. Nyman:

It is always a pleasure to me to listen to a paper by Dr. Ottolengui, because he has such a good command of language. They tell me that he spends most of his spare time at the Century Publishing House, looking over the new editions of the Century Dictionary. And he is so logical. When he is not logical, he is so deucedly clever that he makes sophistry sound like logic. (Laughter.) His voice is not altogether unmusical; and I submit to you that his personal appearance is not unpleasant to the artistic eye. It is a pleasure to me look upon and to listen to Dr. Ottolengui. He is also something of a diplomat.

Many a time I have read papers written by him and after doing so sat down in haste, with a view to writing an article in reply, repudiating what he had said, but something would happen so that I could not do it just then. After reading what he had written a second time, I found he had inserted words here and there which served as loop-holes, and these loop-holes were so large that if he could not crawl through one he could easily crawl out of the other. (Laughter.) The Doctor is as hard to grapple with and to pin down as an eel.

Dr. Taggart has said that we should not discuss trivialities, but talk underlying principles. Gentlemen, the analysis of any underlying principle is a discussion of the details of which it is made up. So for a few moments I want you to allow me to discuss some of the details of the paper. The Doctor has written an essay on "The Rational Use of Porcelain in the Filling of Teeth." It is a most remarkable essay, in that there are thirteen pages of manuscript devoted to the introductory, and one-quarter page constitutes the essay itself. (Laughter.) What is the rational use of porcelain? The paper says, "The utilization of porcelain should not invariably depend upon esthetic qualities, but likewise upon the preservative features," etc. That is practically the whole paper. Gentlemen, I cannot differ from the Doctor upon his essay. (Laughter.)

My principal reason for preferring a platinum matrix to one of gold is because I can handle it with less danger of tearing or bending it out of shape. I heartily agree with what Dr. Taggart has said with reference to burnishing a platinum matrix. Any substance which has a spring or a certain amount of temper will change its shape. There will be a rearrangement of its molecules when you heat it, consequently I cannot but feel that the last act in the fitting of any matrix, whether of gold or platinum, should not be one of burnishing. I believe in the vast majority of cases much more accurate inlays can be made if impressions are taken, and the matrices made from them.

There is another feature in connection with this work. Every one of us here has little accidents happen in the office. Something happens to the matrix; not much perhaps, but enough to ruin the whole matrix. If we have an impression it is easy to make a new matrix; but if we have made a matrix in the mouth and have dismissed the patient, we have to send for the patient again. Furthermore, you can sit down and make inlays after your busy workday is over. This work, to approach anything like perfection, has got to be done patiently, and perseveringly.

There are two questions to my mind, and two alone, embraced in porcelain inlay work. First, the preparation of the cavity for an inlay; second, the cement question. I have made many inlays, and I have seen inlays which were perfection when set with saliva (laughter), but which were the veriest failures, from an artistic point of view, when set with cement.

It has been stated here that the retention of an inlay in a cavity is due to the fact that there is a close joint between the tooth substance and the inlay; in fact, that the process of attaching an inlay to a tooth is analogous to the use of glue in joining two pieces of board. It is not, because cement is not glue, by a long ways. There is a vast difference in the physical properties of tooth structure and porcelain, and no mechanical expert would attempt to glue together a piece of steel and a pine board, and yet there is no greater difference between a piece of steel and pine board than there is between tooth structure and porcelain. Furthermore, no mechanical expert would attempt to glue together (and rely upon the glue alone) and retain a joint of a piece of mahogany and a piece of yellow pine. Why? Because there is a slight physical difference in the two woods. Examine a piece of furniture. If you investigate the joints, you will find the dowels have been driven through the angle, so that they cannot pull out. Even glue alone will not hold the joints, nor cement. Again, Dr. Reeves, it seems to me, has refuted his own statement. He says you must have as accurate and as close adaptation as possible, in order to secure retention of the inlay by the cement. Then he makes use of a measure, after he has a close joint, which destroys it altogether, because he coats the surface of the inlay that comes in contact with the tooth structure with hydrochloric acid, which, even if it touches the edges, must remove an appreciable amount of porcelain.

DR. EDMUND NOYES:

The last speaker (Dr. Nyman) is mistaken in regard to the attachment of a piece of mahogany to a pine board. My father had a bookcase made in that way, where the mahogany is veneered upon a pine backing, and the bookcase was made before I was born.

DR. NYMAN:

I admit that joints on which very little or no stress is brought are made in that way. There are few inlays placed in the mouth, especially as advocated and utilized by the essayist, that are not subjected to stress in mastication. Glue is not used to maintain or retain a joint, provided stress is brought to bear on the joint. There was a point Dr. Ottolengui based a good deal of his arguments on, namely, Jenkins' method of making porcelain inlays was superior to that adopted by the high fusing men, because he could make porcelain inlays for cavities by the Jenkins method, and use gold matrices where platinum matrices could not be adapted. That brings us to the point of cavity preparation. I imagine I could make just as strong an argument if I should say amalgam is a better substance to fill teeth with than gold, because I can fill a cavity with amalgam that you cannot fill with gold. If Dr. Ottolengui is supported in his claims that the Jenkins' system can be used to greater advantage than the other, then you must agree that I can shape cavities in teeth that he cannot fill with gold without altering the shape of those cavities, and I can fill them with amalgam. To my way of thinking, the argument has no more force in one case than in the other.

DR. H. W. GILLETT, of New York City:

There are one or two points I would like to take up in connection with this subject. I agree with what Dr. Taggart has said in reference to underlying principles. Let us get away from a discussion of the little things, and realize that we are talking too much about personal equation.

I use both high and low fusing bodies. I find uses for both bodies in different places, and to me it is just as rational to discuss the question, which is the better, as it is to discuss the question, which is the better, amalgam or gold? I would just as soon give up one kind of porcelain material as to abandon one kind of filling material.

Dr. Ottolengui (closing the discussion):

I will try and give you an example of rapid-fire talk. Dr. Nyman has made a lot of remarks with nothing in them. He has made a false diagnosis of me. I do not spend most of my spare time at the publishing house of the Century Dictionary in looking over, as he says, the latest editions of the Century Dictionary. I use the Standard Dictionary. As a matter of fact, my fluency is congenital. My name is Otto (long); lengui (tongue), meaning long tongue. (Laughter.)

Dr. Nyman says I am a diplomat, because I sometimes talk right without saying anything. He said he was inclined to give me the title of diplomat of the dental profession. Gentlemen, New York is not going to take away that title, for it belongs to Nyman, who talks and writes without saying anything. He said I am so clever as to make sophistry look like logic. That is because he does not know what logic is. He said some nice things about me, which refuted everything else he said.

But, seriously, gentlemen, the great strength in any paper is to leave out that part on which you expect the enemy to attack you. The only particular advantage in using high fusing porcelain instead of low fusing porcelain would be either more ease of manipulation or the attainment of better results. The reason you want to use a high fusing body is because it is stronger. That is your strong argument. Dr. Reeves says, What is the use of talking about strength when either one of them is strong enough? Let me inform you that Jenkins body will stand a thousand pounds of pressure to a given mass, and Brewster's crushes at 655.

Dr. Reeves:

I have not seen any of those tables.

Dr. Ottolengui:

I am pleased to bring the information to you, sir. (Laughter.)

Now we come to the advantages of painting methods. I never caught on to that before. We find out the advantage of having a method of painting is to reproduce tobacco stains on teeth. I had a young man in my office whose teeth were filthy and badly tobacco stained. Do you suppose that I put in any porcelain fillings in his teeth? No, sir. I filled them with gold, and it takes a reproduction of the stain in color with tobacco.

In the matter of reproducing defects, that is another sophistical, illogical and unattractive argument made.

To be serious, gentlemen, it comes down to this: High fusing men have in the past been criticising the Jenkins method, while we have not put ourselves in the position of criticising theirs. We grant that you can do it, and we can prove to you that we can do it, and we are going right on doing it. Do not decry the Jenkins system. There are places for the use of both methods.

I have the pleasure of announcing to you that Dr. Jenkins is about to introduce a high fusing porcelain which will have all the qualities this low fusing porcelain has, and which, I have said, are not obtainable in any other. In this connection I wish to take you into my confidence (I shall not mention any names), and tell you that some of the high fusing materials sent to the Jenkins laboratory for examination have matter in them which should not be in those bodies.

Dr. Jenkins says: "The advantages my body has over the others are from the processes of refinement. I have taken those bodies which you have sent to me and I have refined them according to my processes, and I have made better bodies of them. That is what I mean when I say there is something in it (the Jenkins body) which is not in the others. It is the process by which extraneous matter has been removed, so that there is a more homogeneous union between the various particles which you all know fuse at different temperatures. Therefore, you have got a closer, a denser, and a more homogeneous mass."

I understand that Dr. Jenkins has now added better ingredients since there seems to be a demand for high fusing bodies. So that he will presently give to the dental profession a high fusing body possessing all those advantages which he claims for the low fusing body. When he gets that, I hope the gentlemen of Chicago will make fillings or inlays by both methods. I am only waiting for the proper material. (Applause.)

(Dr. Ottolengui passed around two teeth with cavities for which he had made fillings with Jenkins body, and two for which Dr. Reeves, using a platinum matrix and high fusing body, had made two fillings likewise. The committee, through Dr. W. H. Taggart, made a report of having examined these, and had selected both of Dr. Reeves' fillings as having better margins, although the committee was free to admit that neither was as well contoured.)

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THE CONGRESS.

As will be seen by the following announcement of the committee of organization the work of the congress to be held in St. Louis in 1904 is well under way. The time is none too long in which to prepare for so large and important a meeting as this promises to be, and it simply remains for everyone interested in the work to take hold with a will and make the occasion a memorable one in the history of the profession:

Universal Exposition, St. Louis, 1904. Fourth International Dental Congress.—August 29 to September 3, 1904.

Committee of Organization of Fourth Dental Congress: H. J. Burkhart, Chairman; E. C. Kirk, Secretary; R. H. Hofheinz, J. W. David, Wm. Carr, Wm. Crenshaw, W. .E Boardman, Don M. Gallie,, .V E. Turner, G. V. I. Brown, J. Y. Crawford, A. H. Peck, M. F. Finley, J. D. Patterson, B. L. Thorpe.

The Department of Congresses of the Universal Exposition, St. Louis, 1904, has nominated the Committee of Organization of the Fourth International Dental Congress—to be held in August, 1904, in connection with the Exposition—which was appointed by the National Dental Association, and has instructed the committee thus appointed to proceed with the work of organization of said Congress.

Pursuant to the instructions of the Director of Congresses of the Universal Exposition, 1904, the Committee of Organization presents for your consideration and information the subjoined outline of the plan of organization of the Dental Congress.

The Congress will be divided into two departments: Department A—Science (divided into four sections). Department B—Applied Science (divided into six sections).

Department A—Science: I. Anatomy, Physiology, Histology, and Microscopy; Chairman, M. H. Cryer. II. Etiology, Pathology, and Bacteriology; Chairman, R. H. Hofheinz. III. Chemistry and Metallurgy; Chairman, J. D. Hodgen. IV. Hygiene Prophylaxis, Therapeutics, Materia Medica, and Electro-therapeutics; Chairman, A. H. Peck.

Department B—Applied Science: V. Oral Surgery; Chairman, G. V. I. Brown. VI. Orthodontia; Chairman, E. H. Angle. VII. Operative Dentistry; Chairman, C. N. Johnson. VIII. Prosthesis; Chairman, C. R. Turner. IX. Education, Nomenclature, Literature, and History; Chairman, T. W. Brophy. X. Legislation; Chairman, Wm. Carr.

COMMITTEES.

The following committees were appointed: Finance—Chairman, C. S. Butler. Program—Chairman, A. H. Peck. Exhibits—Chairman, D. M. Gallie. Transportation—(To be appointed.) Reception—Chairman, B. Holly Smith. Registration—Chairman, B. L. Thorpe. Printing and Publication—Chairman, W. E. Boardman. Conference with State and Local Dental Societies—Chairman, J. A. Libbey. Dental Legislation—Chairman, Wm. Carr. Auditing—(Committee of Organization.) Invitation—Chairman, L. G. Noel. Membership—Chairman, J. D. Patterson. Educational Methods—Chairman, T. W. Brophy. Oral Surgery—Chairman, G. V. I. Brown. Prosthetic Dentistry—Chairman, C. R. Turner. Local Committee of Arrangements—(To be appointed.) Essays—(To be appointed.) History of Dentistry—Chairman, Wm. H. Trueman. Nomenclature—Chairman, S. W. Foster. Promotion of Appointment of Dental Surgeons in the Armies and Navies of the World—Chairman, Wm. S. Donnally. Care of the Teeth of the Poor—Chairman, Thomas Fillebrown. Etiology, Pathology, and Bacteriology—Chairman, R. H. Hofheinz. Prize Essays—Chairman, James Truman. Oral Hygiene, Prophylaxis, Materia Medica, Therapeutics, and Electrotherapeutics—Chairman, A. H. Peck. Operative Dentistry—Chairman, C. N. Johnson. Resolutions—Chairman, J. Y. Crawford. Clinics—Chairman, C. E. Bentley. Nominations—(To be appointed.) Local Reception Committee.—(To be appointed.) Ad interim—Chairman, G. V. I. Brown.

The officers of the Congress, president, vice-presidents, secretary, and treasurer, will be elected by the Congress at large at the

Dr. Burton Lee Thorpe of St. Louis responded to Dr. Tucker, and very ably, too, voicing the hope that Imperial Missouri as a host would have the pleasure next year of expressing her welcome and St. Louis, the queen of the Mississippi Valley, as hostess, will unite in extending you all the same whole-souled, generous Southern welcome that this day has been tendered us.

The president's address (Dr. Noel's) was delivered after the addresses of welcome and responses had been enjoyed.

There was a vast amount of business transacted by the various sections and by the society as a whole at the various sessions which I have not been able to record for you in so short a space of time. The clinics, too, were very interesting. The majority of them were similar to those presented at Asbury Park. The list of exhibitors and the general display was far less than either at Chicago at the Odontographic meeting last winter or at Asbury Park, and it was probably due to lack of facilities more than anything else, although I overheard some of the exhibitors in conversation who seemed to be dissatisfied and were debating the feasibility of exhibiting during the National Convention at St. Louis.

The business of the last day was centered principally on politics and the choosing of candidates for the several offices to be filled. With no dissension of note these gentlemen have been elected to assume control for the coming year:

Dr. C. C. Chittenden, of Madison, Wis., President; Dr. Harry P. Carlton, of San Francisco, Vice-President for the West; Dr. Waldo E. Boardman, of Boston, Vice-President for the East; Dr. John G. Fife, of Texas, Vice-President for the South; Dr. C. S. Butler, for Corresponding Secretary (Buffalo, N. Y.); Dr. A. H. Peck, of Chicago, as Recording Secretary; Dr. V. E. Turner, as Treasurer. Dr. Morgan positively declining to serve again. The Executive Committee is composed of: C. N. Johnson, V. H. Jackson, T. P. Hinman.

The Executive Council of: H. J. Burkhart, B. Holly Smith, J. Y. Crawford, M. F. Finlay, C. M. McManus.

The annual convention of the New Jersey State Dental Society for 1903 is finally a thing of the past. It was the usual grand occasion such as we have come to expect of Jersey. It is understood that each succeeding staff of officers will strive to make the next annual meeting outshine the preceding, and they have attained such eminence now that it is difficult to introduce innovations which can eclipse those of the previous year.

The essays and clinics are the best that can be procured, the exhibits are many and varied; all are of refined character.

If the "stay-at-home" dentist could only be made to realize what a vast fund of knowledge is to be gained at these functions he certainly would spend a little time and cash to place himself in touch with his professional brother. The man who sits in his office and depends upon his own energies and the dental journals to fulfill the requirements of those who entrust their dental confidences to him is—in these days—not an up-to-date practitioner even though he may have unusual ability. The practice of dentistry is striding along at such a rapid pace that by the time the proceedings of our societies find their way into print many of those practices have given way to improved methods or been discarded. The "programme" says—and with some truth—that "the excellence of the man is due mostly to the stimulus of the societies. The more meetings he attends the better dentist he is. He must be up and doing and lead a strenuous life." All dental society meetings are post-graduate courses and not one of us can afford to neglect them.

The programme of this meeting consisted of essays on the "Drug Aspect of Lessons of the Gums," by Dr. A. W. Harlan of Chicago; "Some Considerations on Immediate Root Fillings," by Dr. Otto E. Inglis of Philadelphia; "Tin and Gold in Combination," by Dr. T. D. Shumway of Plymouth, Mass.; "The Treatment of Fracture of the Maxilla," by Dr. D. Genese of Baltimore; "State Sovereignty," by Dr. E. C. Kirk, and another by Dr. T. W. Brophy of Chicago.

It was expected that fifty-four clinicians would occupy the attention of the assemblage one whole afternoon, though probably one-half of that number did not present. But there was ample to engross one in that array and one could not stop to look and listen and not pick up something new.

The paper of the session which seemed to appeal most strongly to the majority was Dr. Harlan on the "Drug Aspect of Lesions of the Gums," probably because it treated more of generalities.

In his paper he portrayed how gum lesions occurred, from injuries, neglect, disease, malnutrition, etc., which if neglected become irreparable.

Foods and food stuffs, the finely comminuted prepared breakfast kind, he said were not taken into consideration as a factor for evil in this era of gum lesions.

Those lesions which Dr. Harlan contended have a distinct drug aspect were brought about through neglect or by the presence of organisms, usually the pus producing kind.

Where the gum had been denuded from the necks of teeth great care should be exercised to coax it to grow and recover the root which could be done if the patient were under forty. The gums always do well when properly massaged. Some reference was made to the use of the Finsen ray and the possibilities of cures being accomplished. The bacteriological effect is produced by the ultra-violet ray in something less than four or five seconds in a field with full exposure. Dr. Harlan promised that soon there would be on the market a sufficiently simple Finsen principle outfit that would give us all an opportunity to test its merits.

In fact Dr. Harlan's paper was so sweeping that any one of the main subjects might be selected and a discourse constructed therefrom.

Dr. Wilbur Dailey discussed the paper very ably bringing in his treatment, the use of bi-carbonate of soda as a dentifrice. He prescribed it in lieu of any dentifrice or mouthwash.

Drs. R. M. Sanger and L. C. LeRoy opened the discussion on Dr. Harlan's paper.

Toward the close of the session there was a scramble to get away. Of course the majority of the active members wished to have voice in the selection of officers for the ensuing year. Without much electioneering these very popular men were elected:

Dr. Herbert S. Sutphen of Newark, President; Dr. W. G. Chase of Princeton, Vice-President; Dr. Chas. Meeker of Newark, Secretary; Dr. H. A. Hull of New Brunswick, Treasurer; Executive Committee—Drs. W. W. Hawke, T. S. Dunning, Jos. E. Duffield and C. S. Hardy. Yours truly,

"The Boroughs."

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, THE DENTAL REVIEW, 55 State Street, Chicago, Ill.]

Convenient Matrices:—I use a comparatively new clock spring cutting off small sections as needed, for matrices and find them satisfactory. HENRY L. WHIPPLE, Quincy, Ill.

Sealing an Arsenical Application: — A pledget of cotton dipped in chloro-percha of a creamy consistence makes a soft material with which to seal an arsenical application in a tooth.

A. W. THORNTON, Chatham, Ont.

Cleaning Cement Spatulas, Etc.: — Very fine emery cloth such as jewelers use is found effective for cleaning cement spatulas and other instruments where a polished surface is desired.

J. M. BRIMACOMBE, Bowmanville, Ont.

Preparing Canal Points: — Pinch the large ends of the gutta-percha canal points with a pair of flat-nosed pliers. You can then handle them without difficulty with the operating pliers when you are inserting them into the canals.

A. W. THORNTON, Chatham, Ont.

Preventing Moss Fibre Gold from Adhering to Instruments:—If you use smooth faced pressure pluggers in inserting moss fibre gold you may be glad to learn that when the gold sticks to the instrument if you rub the face of the instrument heavily on a piece of pure black tin the gold plating thereon will disappear and the gold will not adhere for some time, after which the procedure must be repeated. Never mind about the tin. I have not forgotten and neither have you that many eminent men have advocated tin and gold in combination, little realizing in the beginning that they united. HOMER ALMON.

To Electro-Gild Orthodontia Appliances, Etc.: — Make a solution by dissolving ammonium carbonate and potassium cyanide, each one ounce in one pint of rain water. Attach the appliance to the zinc pole and a piece of pure gold to the carbon pole of any form of cell battery. Place the solution in a porcelain pan over a low flame, allowing it to boil slowly. Keep the appliance and gold in the solution from ten to fifteen minutes. The appliance will come out with a dark brown color, but after brushing it with a stiff brush, filled with sodium bi-carbonate it will have a rich gold color.

J. Q. Byram, Indianapolis, Ind.

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Packing Rubber for Vulcanizing: — When packing rubber in the flask for vulcanizing, wedge shaped pieces, pink, should be first packed between the teeth. The pins of the teeth should now be covered with narrow strips of red rubber, after which strips of pink, cut wide enough to cover all parts that are to represent the external gum should be placed in position, being careful to overlap the ends to prevent the red rubber from being forced through where the ends are joined. The balance of the red rubber may now be placed where it is needed and if there are no air holes in the plaster investment, the denture when finished will be free from unsightly red spots on the artificial gum.

C. R. Taylor, Streator, Ill.

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Starting Gold Fillings: — One of the pleasures of filling teeth with gold is to have the first piece remain firm in its proper position in the cavity. There is nothing so effective as a thin layer of cement to aid the operator in starting gold fillings. The cement should be placed in the cavity nearest the pulp and before it becomes hard insert a pellet of gold large enough to lap over the cement, being careful to avoid pressing the cement out over the enamel margins. The gold should not be worked much until the cement becomes too hard to spread. The cement is especially useful in minute cavities, and is a valuable aid in retaining the first pellets of gold in step cavities both in the seat and step.

C. R. Taylor, Streator, Ill.

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To Make a Handy Mouth Blow-Pipe: — Obtain an old brass bicycle pump and remove the plunger. Unscrew the cap and insert the end of a small mouth blow-pipe (about four inches long) in the hole in the cap as far as it will go. Mark it, cut off the small projecting end and solder to the cap. Now make a hole in the opposite end of the pump large enough to admit the remaining end of the pipe and attach with solder. Obtain some brass wire gauze, roll it with cotton and pack loosely in the pump chamber. Saturate the gauze with gasoline or alcohol and use with an alcohol or gas flame. You will find this a very convenient appliance for soldering at the chair and waxing up cases. Make one when you have time and you will not regret it.

C. J. Hadley, Chicago.

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Method of Treating a Chronic Abscess: — A chronic alveolar, abscess with fistulous opening may be cured in one treatment (provided a fairly good communication can be established through the pulp canal and out the fistula) as follows: Open up pulp chamber freely, remove all debris possible from root canal and irrigate thoroughly with your favorite antiseptic wash, being careful to force the liquid through the canal and fistula. Dry the canal as thoroughly as possible, wipe out with carbolic acid, creosote or oil of cloves, and pump chloro-percha through the canal until it appears at the fistula. Insert your gutta-percha canal point and also the permanent filling in the crown and you can dismiss the patient with the assurance that the fistula will heal from the bottom outwards and disappear entirely in a few days. I have never had this treatment fail.

Arthur G. Smith, Peoria, Ill.

* * *

Removing Pulps with Cocaine: — Recently I had occasion to remove live pulps from the upper left first bicuspid and upper right first molar for a school teacher, who was preparing to leave for her vacation on the following day. Thinking to save time, I placed a small pledget of cotton wet with a saturated solution of cocaine, in the cavity of the molar, directly upon the exposed pulp. To prevent the cocaine getting into the mouth, I filled the cavity wth gutta-percha, making but slight pressure upon the pulp. Then I applied my rubber dam to the bicuspid on the other side of the mouth, removed the pulp with pressure anaesthesia, and filled the root, and tooth, consuming an hour in the operation.

When I came to work on the molar, I found that the cocaine with slight pressure had done its work and the molar pulp came out without any pain and with less trouble than I had expected.

W. A. Johnston, Peoria, Ill.

MEMORANDA.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

The sixth annual meeting of the Southern California Dental Association, will be held at Los Angeles, in the Dental College of the University of Southern California, on Monday and Tuesday, September 28 and 29, 1903. All ethical practitioners are cordially invited to attend.

Lewis E. Ford, Secretary.

307 S. Broadway, Los Angeles, Cal.

MINNESOTA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Minnesota State Board of Dental Examiners will be held Oct. 6 at the Dental Department of the State University at Minneapolis, Minn.

Candidates should bring their diplomas and instruments for insertion of a gold filling.

F. E. Moody, President,
Minneapolis, Minn.

C. H. Robinson, Secreary,
Wabasha, Minn.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The following list of officers were elected at the meeting of the National Association of Dental Examiners held in Asheville, N. C., July, 1903: President, Burton Lee Thorpe, 3666 Olive street, St. Louis, Mo.; First Vice-President, from West, James J. Reid, Chicago, Ill.; Second Vice-President, from East, J. Tenny Barker, Wallingford, Conn.; Third Vice-President, from South, T. B. Whitney, Salem, Ala.; Secretary and Treasurer, Charles A. Meeker, 29 Fulton street, Newark, N. J.

Chas. A. Meeker, Secretary.

THE ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Illinois State Board of Dental Examiners, to examine applicants for license to practice dentistry in this state, will be held in Chicago, October 15, 16, and 17, 1903.

The following are eligible to take the examination before the Board: "Anyone holding a medical diploma from a reputable college; anyone who has been a legal practitioner of dentistry for ten years prior to moving into the state, and anyone who failed to register in this state at the time the law went into effect, which was in 1881."

Candidates must furnish their own patients, and come provided with the necessary instruments, rubber-dam and gold to perform practical operations and such other work as is deemed advisable by the board. Those desiring to take the examination should matriculate with the secretary at least ten days before the date of meeting. The examination fee is $10. Any further information can be obtained by addressing the secretary.

J. G. Reid, D.D.S., Secretary, 1204 Trude Bldg., Chicago.

PATENTS OF INTEREST TO DENTISTS, RECENTLY GRANTED.

733807. Frictional gearing for dental machines. Luther L. Bosworth, Cleveland, Ohio.

733410. Rubber-Dam holder, Edmund B. Marshall, Rome, Ga.

734072. Dental clamp, Philip B. Laskey, Marblehead, Mass.

734865. Dental crown slitter. George K. Heist, Winchester, Va.

735543. Dentist's clamp, Victor Malizan, and J. G. Prochaska, Chicago, Ill.

12143. Re-issue—Apparatus for swaging gold crowns, Benjamin B. Brewer and W. M. H. Burfeind, San Francisco, Cal.

735762. Dental mouth-prop, mirror and tongue protector, Wm. Hare, Danville, Ill.

736101. Dental tool, Gershom B. Hough, Somerset, Pa.

735929. Dental mixing tablet, James I. Woolverton, Trenton, N. J.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

Obituary.

DR. WILLIAM C. BARRETT, M. D., D. M. D., D. D. S., L. L. D.

Just as we go to press the sad news reaches us of the death of Dr. W. C. Barrett of Buffalo at Badnauheim, Germany, August 22.

While attending the Albany meeting last January he fell and dislocated his shoulder. The action of his heart following the administration of the anaesthetic was so abnormal that his physician advised a trip to Europe in hopes of a beneficial result. The immediate cause of his death is unknown. An extended account of his career will appear in the October number of the *Review*.

DR. E. L. CLIFFORD.

Dr. E. L. Clifford, a dentist in Chicago who for years had been identified with dental societies and dental literature, died from an overdose of morphine accidentally administered Aug. 14, 1903.

Dr. Clifford was a gentleman of ability and had made his impress upon dental thought through his writings upon dental therapeutics. He was a member of the Odontographic, Chicago Dental and State Societies. A widow and one child survive him.

THE

DENTAL REVIEW.

VOL. XVII. CHICAGO, OCTOBER 15, 1903. No. 10

ORIGINAL COMMUNICATIONS.

CAVITY PREPARATION FOR PORCELAIN INLAYS.*

By A. E. PECK, M.D., D.D.S., MINNEAPOLIS, MINN.

The chief requirement in the preparation of cavities for porcelain inlays is: to have them so constructed that the filling obtains the necessary retention combined with a form that will withstand the stress to which it may be subjected.

To do this three things are necessary: First, the shape of the cavity must give retention to the filling; second, it must be so constructed that an impression can be drawn from it; third, the walls of the cavity must be perpendicular to the respective surfaces of the tooth which they intersect. This will give a square body of porcelain for the filling, whose resistance to stress at the margins is equal to the greatest strength of the material.

Permanence and stability should have equal consideration with æsthetic features, and this can only be obtained by a correct preparation of the cavity. Many of the profession have not given this phase of the subject their most serious thought, their efforts being largely directed toward the æsthetic side.

Imperfect construction of the cavity does not prevent the placing of an inlay with all the artistic features of a perfect piece of work, and yet from a permanent standpoint it may be a complete failure.

We ought not draw too positive conclusions as to the preservative qualities of porcelain versus gold, by the results of a few. Time only will prove this part of the question, and until we have obtained a system of cavity preparation which will give to the filling all the strength of the material, we will only have to wait for time to prove the inefficiency of our work.

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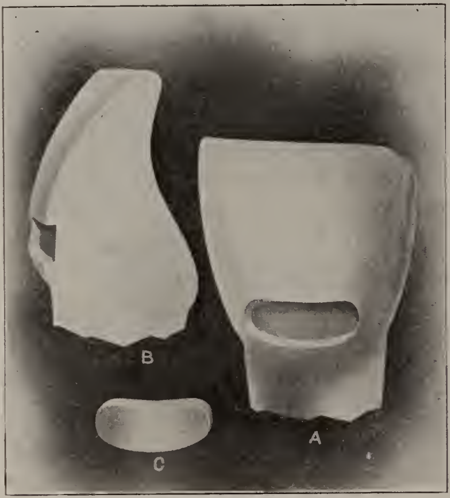
*Read before the Minnesota State Dental Association.

In presenting this paper it has been the writer's endeavor to consider the accepted theories of our best authorities, and to so construct the cavities that they will give to the inlay all the strength of the material, believing that close adherence to the principles of this system will give all the permanence possible with the material used.

For explanatory reasons I have divided cavity preparation into eight classes:



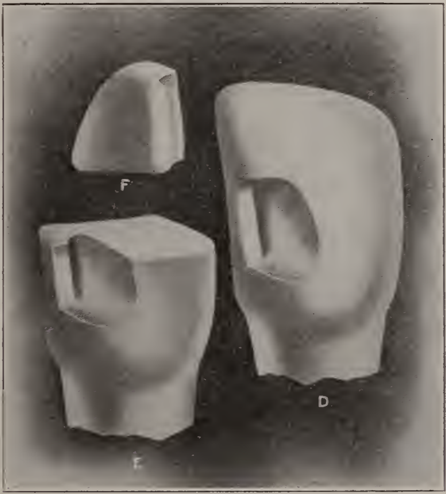
II.

1—Cavities involving one surface, labial cavities.
2—Cavities involving more than one surface, mesio-labial.
3—Cavities involving mesio-labio-lingual.
4—Cavities involving mesio-labio-linguo-incisal.
5—Cavities involving labio-linguo-incisal.
6—Cavities involving the whole incisal edge.
7—Cavities involving the proximal and occlusal surfaces of the posterior teeth.
8—Cavities involving the whole occlusal surface of the posterior teeth.

The three initial steps in cavity preparation are the same in this as in all others: First, breaking down of undermined enamel;

second, removal of the softened dentine; third, extension for prevention. But the fourth, extension for retention, is a distinctive feature of this system, the theory of which must be fully comprehended before any attempt to put it into practice in the mouth.

The preparation for the first class (labial cavities), which involves only one surface of the tooth, differs only from the usual preparation in that the walls of the cavity must be perpendicular to the respective surfaces of the tooth which the lines of the wall intersect. This preparation gives a body of porcelain whose lines are perpendicular to each other, thus giving to the inlay all possible strength, obviating the acute angle (or fragile edge), which is to be avoided at all hazards. Plate II, Fig. A, shows a full view of this preparation. Fig. B shows a cross section from the incisal edge to the gingival border, illustrating the angle of the walls of the cavity in relation to the surface of the tooth.

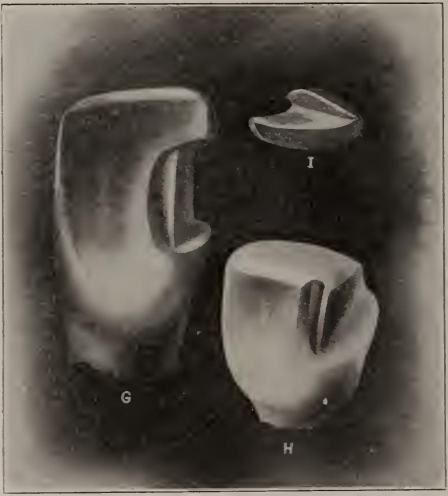


III.

The second class of cavities (mesio-labial), involving the labial and proximal surfaces (but not the lingual), are inserted without a separation of the teeth. Plate III, Figs. D and E, show the method of preparation with the retention which is obtained by means of a groove in the bottom of the cavity.

It will be noticed that the incisal and gingival borders of the cavity are at right angles to the proximal surface. This gives a solid body of porcelain which is very essential to the life of the inlay. Fig. F shows the inlay with the retention ridge. The cross section, Fig. E, shows the groove for retention.

Cavities of the third class (mesio-labio-lingual) give the best opportunity for artistic results. In this class we not only extend for prevention but for retention also. These fillings should be inserted from the lingual surface, and the extension for retention must extend to the firm tooth substance. A slight grooving in the floor of the cavity near the margin on the lingual surface, as shown by Plate IV, Figs. G and H will give a perfect retention from all lateral pressure. Fig. I shows the ridge on the inlay.



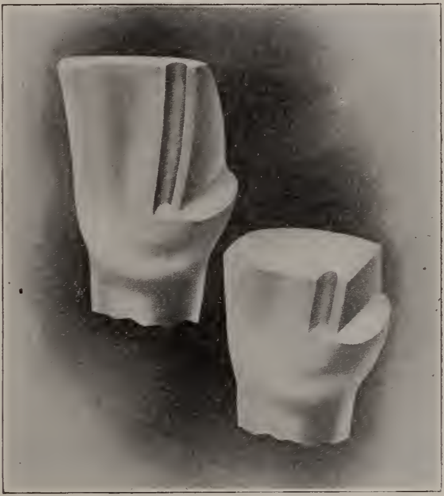
IV.

The walls of the cavity, from the lingual surface to the labial, must be slightly V-shaped, which will avoid loosening from the lingual pressure; labial strain will not be sufficient to disturb it.

Cavities of this class can approach the incisal edge much closer than would be safe in preparing for a gold filling. It is the force of the blow in the operation which weakens the enamel prisms, thus causing a gold filling to fail. But, if the enamel rods are left in perfect condition and an inlay that exactly fits is cemented in, then they have nearly, if not the same, support they had before the ravages of decay set in.

Cavities of the fourth class (mesio-labio-linguo-incisal) are the most difficult, and require a great deal of good judgment, skill and patience.

Plate V, Fig. J, represents the typical preparation to illustrate this class of cavities. The formation is such that most of the retention is obtained by means of a groove, thus avoiding a deep seat in the tooth, which not only encroaches on the pulp so as to menace its life, but also weakens the walls and necessitates a wide separation to admit removal of impression and insertion of the filling.



J K
V,

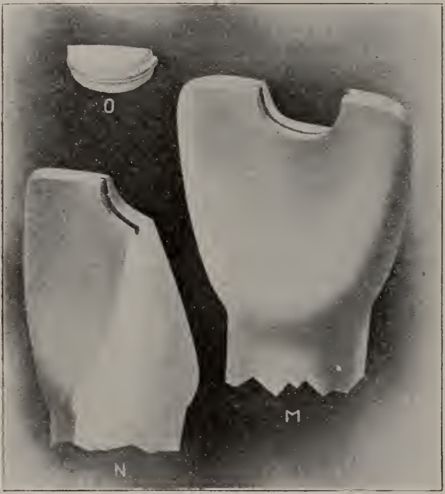
The preparation for this class of cavities, as illustrated by Plate V, is as follows:

After the margins for the labial and proximal surfaces are secured, the extension for retention on the lingual surface is started from the incisal edge, gradually sloping back to the firm tooth substance near the gingivo-lingual border, keeping well in mind that the walls must be perpendicular to the surface of the tooth. Retention from lateral strain is obtained by a groove made in the base of the cavity, as illustrated by Fig. K, which is a cross section of Fig. J.

A cavity prepared on this principle will not require a separation to remove the impression, or to insert the filling.

It will be readily understood that the principle of retention is grooves instead of a deep seat in the cavity. A groove should be made wherever it will resist the stress of mastication.

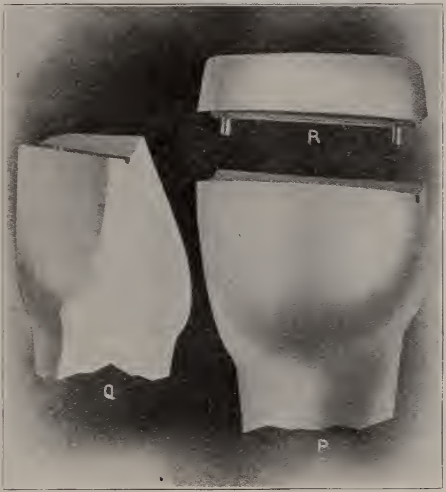
The grooves must be made so that the impression will draw. The cuts are intended to illustrate only the typical cases and make clear the principles involved. The advantages in this system are: that a groove or depression at points in the cavity will not endanger the pulp, and give a much better retention for the filling than the ordinary saucer shaped cavity. It also avoids the necessity for a wider separation than for gold.



VI.

Cavities of the fifth class, involving labio-linguo-incisal, are illustrated on Plate VI, Fig. M. While the cavity at first glance seems to show a V-shape, it will be noticed that a short distance back from the incisal edge the walls are perpendicular to the incisal surface. This is essential, as it gives a solid piece of porcelain without the fragile edge. A slight groove down the sides and across the base of the cavity will give it sufficient retention and yet allow an impression to be drawn from it. Fig. O shows an inlay with its retention ridge.

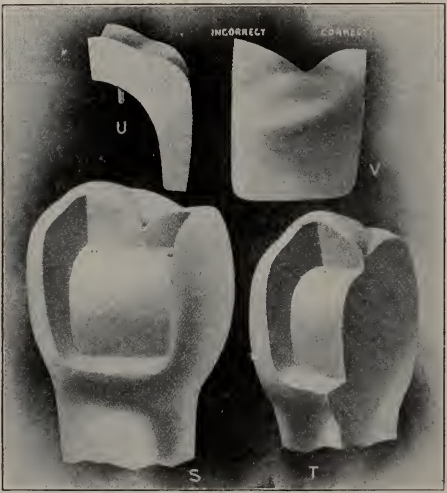
Under the sixth class we have a cavity involving the whole incisal edge. Plate VII, Figs. P and Q, illustrates the preparation, which is made mostly by means of a stone, slightly grooving the center of the cavity, mesio-distally, and bringing the margins of the labial and lingual surfaces to a sharp edge. On either side of the pulp a slight depression is made with a round bur, to mark the place for the pins to be inserted. This will be transferred to the matrix, giving a correct guide for placing the pins. Fig. R shows the inlay with the pins in position. The pins should be about 21 standard gauge.



VII.

Cavities of the seventh class, involving the proximal and occlusal surfaces of the posterior teeth, must be cut well out to the bucal and lingual surfaces, as, unless this is done, it is almost impossible to get perpendicular walls. Plate VIII, Fig. S, is a view looking down into the cavity. Fig. T, same plate, is a cross section showing the retention grooves. Fig. U shows the inlay with the retention pin. Fig. V shows the inlay with a correct angle of porcelain on the right, and an imperfect shape (acute angle) on the left which is almost certain to be made unless the cavity is cut well out to the margins.

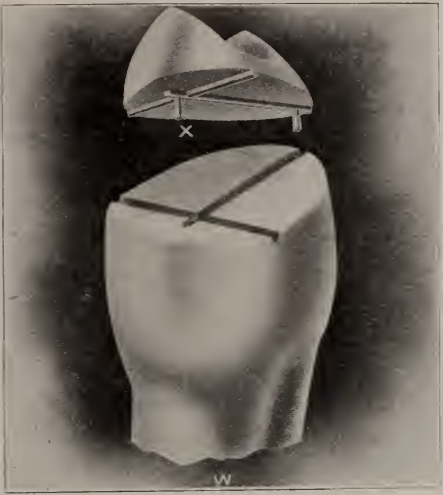
To be successful in this class of cavities, where so great a stress is brought to bear, a solid body of porcelain is absolutely necessary. Pins should be used instead of grooves, for retention, a round bur is used to make a slight depression at the point in the cavity where the pins are to be placed. This will be transferred to the impression and in turn to the matrix. After the matrix is invested in the investing material, the matrix can be perforated at the point indicated by the depression and the pin inserted into the investment, allowing the point to project a sufficient distance to support the inlay. The investment material will hold the pin in position while fusing.



VIII.

Cavities of the eighth class, involving the occlusal surfaces of the posterior teeth, open a field worthy all the time and expense required to become proficient in this class of work. To be able to restore with porcelain the contour, color, and service of teeth that have been worn off so much as to require the bite to be opened, is certainly a great step in dentistry, and the restoration in cases of this class with unsightly gold fillings may now be a practice of the past. Plate IX, Fig. W, gives a view of this preparation, showing the grooves and depressions marking the site of the pins. Fig. X gives a view of the inlay with its retention ridges and pins in position.

In conclusion, I wish to accentuate the underlying principles of this system. The retention is obtained by means of grooves placed in such a position as to resist the strain to which the filling will be subjected, and these grooves must be made so an impression can be drawn. This principle of retention necessitates a perfect adaptation of the matrix to all parts of the cavity, therefore in all but the simplest cavities swedging is the only possible way of obtaining a perfect matrix.



IX.

The last point I wish to impress is the obtaining of a filling without the acute angles. A square body of porcelain will give the greatest amount of strength, and most permanent results.

THE EVOLUTION OF DENTAL PRACTICE.*

By P. J. Kester, D.D.S., Chicago, Ill.

> "The beginning contains within it the end and all that pertains thereto."—Carlisle.

Thus it comes about that all development is but the evolution of the idea, that is part of man's earliest equipment, and modern dentistry is subject to the same law. But unlike many of the sciences it has been, and is being, developed very rapidly, some of us being almost as old as the profession of dentistry itself.

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* Read before the Odontological Society of Chicago.

There are some of us who began the study, if not the practice of, dentistry before the introduction of cohesive gold, the rubber dam, the dental engine and the wonderful electrical appliances that have become a necessary adjunct to every well regulated office to-day.

Some one said at the recent meeting of the Institute of Dental Pedagogics, that we had "apparently reached the very limit of dental knowledge." To those who are in the very forefront the advance made seems logical and final. In the evolution of dental practice there have appeared abnormal growths which have interfered with the normal development of true professional ideals. There is nothing static in the material world, and dental practice must move along with everything else, appropriating the true and discarding the false.

This was impressed upon my mind in a forcible way. Inasmuch as I had practically retired from the professional world for a few months, and upon my return, feeling somewhat like old Rip after his long sleep—for I felt that I had fallen far behind the procession—I found myself looking upon a new world, it seemed to me. Many new methods and new remedies were acquired, but I'll only mention two briefly, viz.: The adoption of the porcelain inlay, and the introduction of the system of removable bridge work, seemed to me to have completely revolutionized dental practice.

The porcelain inlay combined all of the qualities of all of the various filling materials, calling for the highest expression of the artistic in the operator, while the introduction of the system for removable bridges united the very best elements of the ordinary plate to the best features of fixed bridge-work. While the one called for the greatest artistic skill, the other required mechanical ability of no mean order. I simply refer to these things to show that we are moving along correct lines.

Mechanically, we are gradually becoming more perfect. Artistically, we are approaching our ideal; and scientifically we are reaching out after the truth. It has been suggested that we are becoming too scientific. Such a proposition is absurd, for in the final analysis it will be found that the practice of dentistry, if anything, must be scientific.

So I will occupy the few remaining pages to the consideration of what seems to me to be the most important subject in dentistry, viz., the purely scientific treatment of diseases of the teeth.

Do not misunderstand me now in what I am going to say, as to the future changes in our mode of practice, for I do not lay claim to originality in anything that I have to offer, only so far that I have had original sense enough to observe, as you all have done, that immunity from decay of the teeth, for instance, depends on something quite outside of the teeth themselves. It is very generally conceded that there is no appreciable difference in the composition of teeth, or, in other words, our classification of teeth as hard or soft is erroneous. The most recent analysis of teeth has shown that teeth have nearly a definite formula, as has bone, etc., and we have also noticed that care of the teeth has had little more to do with immunity.

And it is probably true that those teeth receiving the most careful cleansing decay most rapidly, not because the teeth are cleansed but because of the fact that some destructive element is at work, and the cleansing of them is only one of the many efforts made to preserve them, so that we must look for the real cause of decay, or the prevention of it, outside of the teeth themselves.

That the mouth contains the most perfect natural culture medium in the world is well known, having all of the conditions necessary for the proper growth of micro-organisms, with the micro-organisms themselves present. Yet we also know, that notwithstanding all of these conditions are practically invariable, as to temperature, moisture, food pabulum, etc., yet it is also true that the destruction of the teeth is not at all the same. In one mouth the teeth are absolutely immune, and in another they are being rapidly destroyed by caries. Apparently the conditions are identical, yet there is something, somewhere, which somehow has an inhibiting effect upon the destructive elements, and to discover it, or, what is more important, to stimulate or provide it if absent, is the most important proposition in dental practice to-day.

Dr. Michaels, of France, in a recent pamphlet entitled Sialo-Semeiology (1902), discusses very learnedly the bio-chemical properties of the saliva. His conclusions are: "That so long as we have not discovered the cause of the morbid states (immediate or mediate alterations of tissues), and so long as we have not made a more serious study of the essential factors in biochemistry, and of the relations of diathesis with salivary secretions, so long shall we be unable to explain in a precise way the morphological differences of dental decay." Dr. Miller, in the January *Cosmos*, has begun a series of articles on "Immunity to Diseases of the Mouth and Teeth." He says: "At this point I wish to emphasize one fundamental fact which forms the basis of our studies concerning immunity in its relations to diseases of the mouth and teeth. This fact may be expressed as follows: In the normal intravascular blood of every human being and animal there are substances (alexins) which to a certain degree afford protection against the invasion of pathogenic micro-organisms." He further says: "Various well-known phenomena observed in the human mouth have led to the suggestion that here also protective substances similar to those found in the blood may be found." The saliva, like all recrementitious fluids, contains certain morphological elements whose properties depend on the vital force contained therein, and any experiments made out of the mouth, either chemical or bacteriological, must necessarily be uncertain because the very inhibitory power is probably due to the life principle itself, which is lost in the manipulation.

Thus we see that this matter of immunity, natural or induced, is receiving the most advanced thought of the professional strong men of to-day, and believing in the truth of the quotation which I have used as a text, "That the beginning contains within it the end and all that pertains thereto," so we shall finally arrive at the truth, and dental practice will be based upon purely scientific lines—that the rational treatment of caries of the teeth will be made through the general system, and "cerum theraphy" be an established fact.

PHOSPHOR NECROSIS.*

By W. F. Kelsey, D.D.S., Marseilles.

Though Phosphorus had already long been known to Toxicology, the peculiar action produced upon the human organism by the gradual absorption of its vapors was not remarked previous to 1839, five years after the introduction of lucifer matches in Germany.

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*American Dental Society of Europe.

Public attention was first called to this disease in 1845 by Lorinser and Heyfelder, who, after a long period of independent research, announced the results of their observations nearly simultaneously. This affection is confined almost exclusively to work-people employed in the manufacture of friction matches, a peculiarity attributed to the emanations of phosphoric acid unavoidably inhaled in the workshops. The malady may manifest itself as early as a few months after entering the laboratory, and, according to Riedel, has been observed as late as seventeen years after the occupation has been entirely abandoned.

A long contested point with regard to phosphor necrosis was whether it was a local affection or merely a local manifestation of an organic trouble.

In 1872 Wegner[1] published the result of a series of experiments upon animals, to which he had administered increasing doses of phosphorus for varying periods of time. He particularly remarked the changes produced upon the maxillaries. The bones were distorted, the soft portions were tumefied by caseous infiltrations, and the jaws became fixed, these changes being still more marked when attended with caries of the teeth, or erosion of the mucous membrane. As these phenomena were observed in animals, it was naturally assumed that similar effects would be produced upon human beings under like conditions. The inference was that the frequence of necrosis among persons exposed to the emanations of phosphorus, should be attributed to functional derangements attendant upon a long-continued and gradual absorption of phosphoric vapors. Roussel[2] maintained that the decay of one or more teeth was the indispensable condition for the development of the disease of the maxillaries; whilst Trélat insisted that in certain exceptional cases there was a perfectly healthy condition of the teeth when the first symptoms of the affection were remarked.

This theory was first advanced by Strohl in these words, "The saliva, impregnated with phosphoric vapors, penetrates the interstices of the teeth to the gums and periosteum."[3]

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[1] Der Einfluss des Phosphors auf den Organismus.

[2] Revue Médicale, Mars, 1846.

[3] Gazette Médicale de Strasbourg, 1845.

Magitot[4] maintained that a dead tooth was always the precursor of necrosis, the contamination in the roots serving as a vehicle for transmitting the phosphoric agents to the periosteum, provoking alveolar periostitis, which thus became the starting point of the trouble.

A better explanation is given by Dr. Arnaud of Marseilles[5] in these words: "Phosphor Necrosis is the sequel of an infectious osteo-myolitis of the maxillary, of which the most common mode of penetration is found in an affection of the teeth, or alveolus, or through a dental operation, favored by the general and local action of phosphorus upon the nutrition of the osseous elements of the maxillaries, and develops itself exclusively upon subjects in a receptive condition, in consequence of previous or acquired pathological conditions, or simply aggravated by phosphoric taint."

It is generally known that phosphorism is characterized by disturbed functions of nearly every organ of the body. The respiratory passages are in a state of constant irritation, the digestive functions are impaired, the nervous system is affected, the kidneys secrete an abnormal quantity of urine impregnated with an excess of urea and albumen, with traces of phosphoric acid; the patient is nearly always anæmic, otitis and ophthalmia are frequently remarked, the skin is subject to eruptions, and even the exhalations of the body have a characteristic garlicky odor never to be mistaken when once perceived.

When the functions of the body are thus disturbed and the most elementary rules of hygiene ignored, caries of the teeth is almost invariably present, and the local action of phosphoric acid greatly hastens this decay. Tested with litmus the saliva frequently shows an acid reaction. From decay to pulp exposure is but a step, and once suppuration sets in, necrosis is to be feared with all its dread sequelæ. The timely treatment of a decayed tooth might have averted the danger, but once the disease is declared the extraction of the offending organ will neither arrest the progress of the malady nor relieve the pain.

The gums inflame, swell and ulcerate, whilst the pain may become excruciating. The salivary glands secrete an unusual quantity of saliva, and fetid pus issues from the fistulas, which form in the mouth or appear externally. Bright's disease, bronchial irritation and marasmus frequently supervene in quick succession; now, the deadly germs, finding their way to the stomach and lungs, engender infectious pneumonia; again, the invading hosts of micrococci, streptococci, staphylococci, and all their vile lineage reach the advance defences, attack the bastions of the brain, and cerebro-spinal meningitis with certain death ensues. When once established the malady is very dangerous, different authorities having estimated the mortality at from ten to twenty per cent, or even as high as fifty per cent when both jaws are affected. Several cases of partial necrosis with exfoliation and one severe case with the loss of the greater portion of the inferior maxillary, fell under my personal observation at the Marseilles factory. Except that the reparatory process was less prompt, they usually followed the normal course of necrosis. In nearly every instance there was total disregard of all rules of hygiene, with the natural concomitants of salivary calculus, carious teeth, irritated gums and the characteristic purplish line at the gingival border. After the removal of all local causes of irritation, the frequent use of an antiseptic mouth wash, and a too often unheeded injunction not to spare the brush, these symptoms, in most cases, rapidly subsided. The medical treatment usually recommended is a milk diet to facilitate renal elimination and as much fresh air as possible in order to oxydize the particles of phosphorus contained in the system, together with such other remedies as may seem appropriate in relieving certain peculiar symptoms; Bicarbonate of soda to correct the acidity of the saliva, iodide of potassium, or turpentine, in consequence of a reputed, but not well understood action it has in counteracting the toxic effects of the vapors, are also sometimes prescribed. It is not my province to discuss at length the surgical treatment, which often implies the most heroic operations, resulting, when successful, in deformities that the most skilfully made prosthetic appliances are unable to correct. Suffice it to say that there is some diversity of opinion concerning the advisability of surgical interference when the patient already shows evidence of phosphoric poisoning, for fear that such intervention might open the door to microbic infection and precipitate the malady it was expressly intended to avert.

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[4] La Nécrose Phosphoree, 1888.

[5] Etudes sur le Phosphore et Phosphorisme, 1897.

The treatment should be in a great measure expectative, as the diagnosis of the malady can never be affirmative until the appearance of the sequestrum. Antiseptic mouth washes and injections of phenic or boric acid, or naphthol B. o gr. 25 centigrammes to one litre of water, distilled and boiled, or permanganate of potassium, 6 grammes to the litre, can be employed advantageously, 10 drops in a glass of water.

Dr. Vallin says: "All intervention should be avoided, or postponed until proper hygienic conditions and a sufficiently long absence from the factory has permitted the poison to be eliminated."[6]

No one has ever ventured, in ordinary practice, to oppose so simple an operation as the extraction of a tooth upon the ground that such action might produce necrosis; on the contrary we all insist upon the danger of retaining incurable teeth, and can cite instances where the neglect of this prescription has entailed the most serious consequences.

There are Radicals and Tories in medicine as well as in politics. If we admit with the former the danger of interference, we at least are forced to recognize with the latter that procrastination gives no guarantee of immunity. My personal experience leaves me somewhat uncertain in which camp to plant my standard. I have operated upon scores of work-people suspected of phosphorism, with excellent results, except in one or two notable instances.

The first of these was that of a woman forty years of age, who presented herself at the factory clinic for an apparently simple operation; the extraction of an isolated lower molar. To my great chagrin, my efforts only succeeded in breaking the tooth, even with the process.

A recognized effect of phosphorus upon the inorganic system is in increasing the density of the osseous tissue, thus rendering the bones extremely brittle and liable to fracture from the slightest causes, and it has seemed to me that even the teeth sometimes show evidence of hyper-calcification. Be this as it may, as was customary after even the simplest operation which entailed cicitrization of the wound, the woman was advised to temporarily quit her employment. Acute inflammation immediately set in about the root, continued, and abundant suppuration followed, and in a few weeks the root, which had defied my efforts to remove, was exfoliated, a speedy cure following the elimination of the sequestrum.

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[6] Bulletin de l'Academie de Médicine, 1897.

The other case, that of Marie R., aged twenty, anæmic, but presenting no definitely characterized malady, developed much more serious complications. The young woman complained of a slight glandular swelling and severe pain in the infra-maxillary region, which had been aggravated by the unsuccessful attempt of a fellow practitioner to extract the incriminated tooth, a left lower bicuspid. With no hesitation I took an alveolar forceps, and, forcing it well down, removed the root with little difficulty. A slight fracture of the alveolas was naturally unavoidable. Instead of giving relief, the operation seemed rather to have added fuel to the flame. The pain and swelling increased and necrosis was speedily diagnosed. Sequestrums were formed and eliminated with their corresponding teeth, until, after a few months, of the lower teeth, only two molars were left, like seared trunks after a forest fire, to tell the tale of the suffering the poor girl had endured. There was naturally some disfigurement, which, after her ultimate recovery, was partially corrected by the insertion of an artificial denture. The right half of the upper maxillary is still, three years after the first symptoms of the malady, slightly affected, a fistula exists at either side of an apparently healthy cuspid, though no sequestrum seems to have formed, and the patient appears otherwise to have regained her former good health.

One point little dwelt upon in connection with this disease is the question of heredity. It is, however, generally admitted that there is a more than average mortality among the children of contaminated parents. Does this imply that phosphorism, like tuberculosis, alcoholism and kindred complaints, engenders a predisposition to certain ailments and a lack of resistance to their attacks? Without attempting to answer the question I wish to relate a little incident. One day, whilst treating the daughter of a woman who had worked in the factory for upwards of a quarter of a century, I noticed the peculiar purplish stigma already alluded to upon her gums at the necks of the teeth. Naturally inferring that it was due to phosphoric influences, I asked how long she had been in the factory, and was somewhat nonplussed to learn that the daughter was a milliner. It is presumably an indication of functional disturbances, aggravated by the accumulation of tartar and the direct action of phosphoric vapors, but apparently may exist independently of the latter influence.

If necrosis cannot appear without previous infection, it is evident that a perfect dentition is an almost certain guarantee of immunity from this disease. With decayed teeth, necrosis is always to be apprehended when phosphorus is employed in its ordinary condition. The danger can, however, be minimized, or even averted, by properly enforced hygienic regulations, perfect ventilation, and careful treatment of all incipient caries of the teeth, together with obligatory dental surveillance and a preliminary inspection before entering the factory. Dr. Courtois-Suffit[7] says: "The obligatory visit has caused the mal chimique to entirely disappear from the factory in Pantin." Strange to say, the compulsory visit met with violent opposition from the employes themselves, in consequence of the indemnities paid by the French Government to those who were incapacitated from work for any cause pertaining to their employment. A decayed tooth was sometimes a veritable gold mine for its lucky possessor. An instance is cited where an intelligent working of the placer made it pan out upwards of four hundred dollars. As no specific has been found to correct the phosphoric taint, medical and dental science of the present day direct their attention rather toward prophylaxy than to remedial treatment. If the cause be removed the effect will disappear as a natural consequence.

Already, chemists have shown us how the inoffensive red, or amorphous, phosphorus can be substituted for the dangerous metalloid hitherto employed, and American inventors have proven the practicability of manipulation by machinery in closed compartments, where the fumes offer no inconvenience to the operatives; so that we can safely predict that, in the early future, phossy jaw will be known only to those who delight in musty lore and in comparing old school teachings with the self-sufficient theories of their own day.

"TAKING TO THE WOODS."

By H. Darling D.D.S., Bay City, Mich.

To the "Stay at home," and the busy or isolated man, come some few compensations for what he misses of travel and association.

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[7] La Presse Médical, Mai, 1899.

Compelled, as the dentist is, to spend the greater portion of his time in-doors, on about one square yard of space, and engaged in one of the most tedious and exhaustive of occupations, he welcomes any relief, and the more complete the change the better.

There are a number of combinations of circumstances which prevent many of our fellow laborers from taking frequent and much-needed rests.

"Every man owes it to himself, etc.?"

Well, yes; but when we are unable to pay all our debts, the last accounts settled should be those with ourselves, and so, many of us forego the pleasures and benefits of fellowship which are perhaps in a double sense beyond our reach.

However, we all have somewhere and somheow, within our reach, a way of balancing things to some degree if we will, and here is one of mine. I practiced a few years in the North Land where mighty forests and lakes and distances compelled me to forego many trips to society meetings which would have been both enjoyable and helpful. But I was within easy access of the hunter's and fisherman's paradise. Many men travel far and spend much every year to reach the forest or stream to which I could ride or walk in an hour.

There were trout and bass, and partridge and duck in abundance, but the sport of all sports was deer hunting. Leaving my office one night in November I boarded a train at 5.30, and by 7 o'clock was seated beside the rough deal table in a lumber camp.

I was too tired to enjoy the substantial fare before me. There was but one "course" and it included the entire meal in every sense of the term. When it was finished the men left the room, as they had eaten, without a word and with dispatch, assembling about the fire in their sleeping camp. Here everything was of interest while it lasted, but by 8.30 or 9 o'clock the "scaler" and I were left in undisputed possession. Those men seemed to me to be all asleep within five minutes after their disappearance—at any rate they said they were in "terms" quite unmistakable. They needed to do so.

Before I had slept any time at all, an authoritative shout from the "boss" informed us that breakfast would be ready in thirty minutes. He built a fire and departed. On his return to announce breakfast he found every man ready—except me. If he had been a victim of tooth-ache just then I would have been pleased to relieve him without any fee. It was not yet 5 o'clock. I sat down five minutes late for breakfast, but balanced the account by departing as long before the rest. By the third or fourth day I had succeeded in so regulating my table deportment as to sit down with the rest, but after the first day I never succeeded in finishing with them.

After breakfast the men returned to their camp and awaited the first signs of daybreak, when they shouldered axes and filed away to their labor about a mile down the river. Taking my rifle I departed in quest of a "runway" where I had hopes of finding a deer. With the first faint colorings of light in the eastern sky I found myself waiting and eager. I had been thus established for about five minutes when a slight rustling sound set my heart going in the wildest way imaginable. The deer was a beautiful specimen. He was running from left to right about two hundred yards away, and in two or three bounds had crossed an opening of about twenty yards directly before me. During that time I heard two rifle shots and found as many empty shells on the snow beside me. The deer did not alter his speed in the least. After coming to myself and finding some bullet marks in the surface of the snow beyond, I did a little mental arithmetic with the resultant conclusion that those bullets passed about seventeen feet above that deer. From my position on the crest of the hill I could see into a wooded valley on either side. Through that on the north ran the deep and rapid Tequammenon river. The heavy snow storm of the last forty-eight hours had made each branch and leaf and twig a heavy burden-bearer, but every burden was a thing of most wondrous beauty. The air was clear and crisp, while from the river below came the odors of hemlock, cedar and spruce timber, hauled to the river only the day previous by the lumberman. I waited there indulging the forlorn hope of seeing another deer, meanwhile enjoying the scene, rendered beautiful beyond description, until the sun was visible above the highest trees, making every snowy bank resplendant with a million jewels. The pleasures of that day are beyond description. I can see it all yet, and long to be there again whenever the vision reappears.

I was in complete accord with the disappointed hunter who said "To get a deer is merely incidental." Being there was enough in itself, and I wandered for hours, unmindful of time or distance or game, through the irregular aisles of the forest and 'mid boughs

> "Between whose tangled architecture fraught,
> With many a shape grotesquely wrought,
> The hemlock spire was seen."

About 3 p. m., however, I changed my mind—and the change was complete. Heavy clouds had overspread the sky and the wind was increasing. It began to storm, and half an hour earlier than usual it would be dark. I would have given much to be beside that camp stove so huge and rusty, and more to be beside the equally extensive and rustic table, for I was tired and hungry. Between us lay about five miles of almost trackless forest—and the poetry had all gone out of it.

After consulting my compass I started for the camp, which I reached without trouble, and long after dark. The men said I had been about four miles from camp. I was always more expert in mathematics than in geography, and though I did not contradict them I am sure I had tramped twenty miles. No bed could be softer or repast more sweet than were mine that night.

PROCEEDINGS OF SOCIETIES.

MINNESOTA STATE DENTAL ASSOCIATION.

St. Paul, September, 1902.

REPORTS OF CLINICS.

GOLD INLAY.

By Dr. W. N. Murray, Minneapolis.

(*Reported by Dr. Foote.*)

It was a disto-occlusal cavity in an upper left bicuspid. He opened the cavity in the usual way with a chisel and broke down the enamel with a very large bur. He said he used it almost exclusively in the preparation of those cavities. He cut the usual step in that way and smoothed his margins as he would with any other preparation, but was careful not to let the margins remain too sharp. After preparation of the cavity he takes a piece of platium one-thousandth of an inch thick, folds it over the cavity and presses it in slightly with an instrument, then with a bur he forces these conical sides into the cavity. Then he takes a burnisher and burnishes it as far as he can and anneals the platinum at every step. After replacing he takes a pledget of cotton, wets it and packs it in as tight as he can. After he has burnished it in thoroughly he takes an impression with wax. This is to see if the matrix is properly adjusted. In doing this work you must have an impression of the cavity so it will draw, and the better it will draw the easier it is for the operator. After drawing the impression with the matrix out of the cavity he trims off the surplus wax so as to leave the wax extending out to restore the contour of the tooth, then he replaces it in the cavity to see if there is proper contact with the tooth next in line, and then removing the impression again he takes a piece of pure gold and rolls it down to thirty-six, as we use for packing our contours, which makes an accurate fit around the tooth from the buccal to the lingual as you would put a matrix on. He fits the gold around the wax in such a way that he has a box with the occlusal surface open, and then he burnishes the band around this side which gives him the point of contact. He flows the gold to the proper height and takes away the investment, drops it in place, smooths down his gold and slips it into the cavity. In this case he had a very nice piece of work. In burnishing the margin of the matrix he took a piece of steel tape, folded it over the tooth and drew it as tight as he could, then ironed the edges down just as he would do with a flat iron which gave the finest margin. That was a suggestion made by one of the members of the association and he put it right into practice.

Dr. Rosenquist:

Did he use platinum?

Dr. Foote:

He used pure gold. He started by using a half-thousandth and he used pure gold rolled down to thirty-six.

CONTOUR ALLOY FILLING.

By Dr. J. F. McCrea, Minneapolis.

(*Reported by Dr. Van Duzee.*)

I am sorry to say I did not see the finished operation. The patient was in the chair, the rubber dam had been applied and it was impossible for me to make a critical examination of the filling.

I think that is where the test comes in after the filling is done. We are able to judge a great deal better as to what the results will be.

The cavity was a mesio-occlusal in the lower first molar. The tooth was one of those molars that was thoroughly fissured and grooved, the cusps were prominent, decay was extreme and the cavity was a large one. It was a difficult case to engage to give good results. I think the doctor made a remarkably good cavity preparation under the circumstances.

GOLD FILLING.

By Dr. F. E. Moody and Dr. A. M. Lewis.

(*Reported by Dr. J. M. Walls.*)

The clinic given by Dr. Lewis was really made by Dr. Moyer. Dr. Lewis came here intending to operate, but he was quite ill and Dr. Moyer very kindly relieved him of the operation.

It was a mesio-occlusal cavity in the upper right first molar. The operation was carried on practically the same as it would have been had Dr. Lewis filled it. The anchorage of the filling was made at the gingivo-buccal and gingivo-lingual angles, and the greater part of the retention was made in the occlusal surface of the tooth. The buccal groove was cut out extensively to take out the slight decay and to prevent future decay, and the dentine left beneath it, which gave good support to the anterior buccal cusp. Non-cohesive gold was used in the gingival third of the cavity and the remaining portion was filled with cohesive gold.

Dr. Gloyd, who was to report Dr. Moody's clinic, was not present. The cavity was a disto-occlusal in an upper left second bicuspid, and the preparatory step was cutting out the fissue for an extended base after Dr. Black's method. The matrix was used and the dentine was anesthetized with cocaine by the cataphoretic outfit. I think it was used by Dr. Hartzell.

PORCELAIN INLAY.

By Dr. W. T. Reeves, Chicago.

(*Reported by Dr. J. O. Wells.*)

The operation was a porcelain inlay in a distal cavity in a central incisor. The doctor's cavity preparation was introduced by breaking down the enamel and establishing the outline of his cavity. I believe the doctor's idea is to establish a regular outline for his cavity and to have the actual wall of the cavity free from any overhang, and aims to give to the basal wall such form as will enable him to know positively when the matrix has been placed in its proper position. I noticed that the actual walls of the cavity formed rather obtuse angles with the basal walls of the cavity. The remarkable feature of this preparation was the absence of any retentive form, the doctor's claim being that the adaptation of the inlay is sufficient to retain the inlay in position. The preparation was done with suitable burs and finished with gem points, and the margin was finished with Arkansas stone. The burnishing of the matrix and the swedging process he divided into four steps in this operation. He attempted simply in the first place to establish the outline of the cavity with the matrix material, using a platinum plate of about one-twelfth thickness. He establishes a rough outline of the cavity with this matrix material by pressing the material in the cavity with wet pledgets of cotton, making the point that wet cotton packs better than dry, and also using it in preference to chamois or any other material. After the rough outline of the cavity is established the doctor leaves the material and roughly trims away the excess. He then proceeds to the second step, that is the burnishing operation which is to fit the matrix more especially to the tooth, which he does by pressing the matrix back over the tooth and roughly burnishing it in position. After this step he comes to the third step in the burnishing process, which is to hold the matrix in position with two fingers and burnish the matrix thoroughly. Of course, the metal is annealed to make it pliable. He made the point to only use two surfaces of the burnisher—that is, the ordinary ball burnisher —to use the heel of the ball in applying the instrument. I noticed the doctor had a special style of burnisher for this work. I believe it is a style of his own invention. After the third stage came the finishing process, the burnishing of the matrix, which was done in the rough. This was done to make sure that the matrix was accurately adapted to the cavity. It was done, as I understand it, to correct any distortion of the matrix which might have occurred during the burnishing process. I believe those are all the steps in finishing the matrix. The doctor makes the point that the inlays must be built up from individual primary colors, or in other words that we must get the tint by using the two colors in individual layers in the inlay. These colors are placed in this manner: The body of the inlay, in fact, the whole inlay, is filled in the first place from some basal color. The doctor, of course, is guided in selecting this basic color by the tooth he intends to match. After the matrix is filled with this basic color he cuts away the labial half of the inlay. His colors which he uses in the inlay to give the desired shade are prepared, always using two or three colors as indicated. After the inlay is packed, of course, the baking must be done in the furnace, allowing it to remain two minutes the first time and the next time from one-half to three-quarters of a minute. I think this, however, is a matter of experiment. My experience has been that furnaces vary. The clinic was really reported in the doctor's paper yesterday morning.

GOLD FILLING.

By Dr. J. E. Weirick, St. Paul.

(*Reported by Dr. Orr.*)

This clinic consisted in the filling of a disto-occlusal cavity in an upper first bicuspid. The cavity was quite large. The extension for prevention was here practically demonstrated. His anchorage was principally in the gingivo-buccal and gingivo-lingual angles, also in the occlusal surface, the walls being almost perpendicular. He started his filling with non-cohesive gold, finishing with cohesive. In the operation he used a hand mallet and a plugger designed by himself, the serrations of his plugger being very fine. The finishing was a fine piece of work, the contact and occlusion being perfect.

REPORT OF CLINICS GIVEN AT THE FIFTEENTH ANNIVERSARY OF THE ODONTOGRAPHIC SOCIETY OF CHICAGO, FEBRUARY 16, 17, AND 18, 1903.

[We were unable to secure reports of all of the clinics given, but we publish as full reports of them as we were able to obtain.]

Clinic of Dr. J. W. Clark, of Louisville, Ky.

This clinic consisted of combination fillings, amalgam and gold at the same sitting, using it in proximal cavities of bicuspids and molars, employing tagger's tin or German silver for band matrix. The clinician adapts the matrix to the tooth to be filled in the usual way, takes floss silk or any strong silk thread, and wraps it around the tooth and matrix several times, drawing the matrix firm against the cervical margin of the cavity, to give it firmness enough to resist the pressure used in filling the cavity. Pack amalgam in the cavity, one-fourth, one-third, or one-half full, as desired. Amalgam should be packed in well. Start with De Trey's gold immediately on top of medium soft amalgam. First pieces of gold will disappear. After about the fourth piece, the gold will be seen to assert itself. Fill along until the tooth is completed. Take off the matrix, smooth gold down if it occludes too much, dismiss patient until next day, then one can take strips and polish down filling on proximal surface. The amalgam having become thoroughly hardened, there is no danger of veneering the gold filling with mercury. The clinician claims ease of adaptation and manipulation over gold at the cervical margins, making a better filling than gold alone.

Clinic by Dr. A. G. Fee, of West Superior, Wis.

Dr. Fee made a mesio-occlusal gold filling in an upper second left bicuspid. Cavity preparation after Dr. Black's method. The gingival third was filled with unannealed foil, consisting of three-quarter sheets, and one-half sheet of No. 4 foil, folded into ribbons a little wider than the seat of the cavity, and with a Swiss broach rolled into cylinders. One-quarter cylinder was placed in the linguo-gingival angle, one in the bucco-gingival angle, and one more placed beside the one in the linguo-gingival angle. The half sheet was now placed between those already in place, and all four cylinders driven home. The cylinders were placed horizontally in the seat, with one end resting against the pulpo-axial wall. The filling was completed with annealed foil for restoring original contour, the point of contact, and preserving interproximal space.

Clinic of Dr. James W. Cormany, of Mount Carroll, Ill.

This clinic consisted of preparing and inserting a gold filling in a mesio-occlusal cavity in a left upper central incisor. The cavity was started with moss fiber gold, covering bottom and gingival margins, filling main cavity with Paçk's crystal foil cylinder gold, contouring with Rowan's gold and platinum folds, shade 1, thickness 30. The cavity and margins were scientifically prepared; the gold artistically inserted, and filling finished beautifully, a monument to the skill of the American dentist.

Clinic of Dr. W. H. Cudworth, of Milwaukee, Wis.

This clinic was on porcelain inlays, the clinician using Jenkins' porcelain body. He demonstrated the method of cavity preparation, forming of matrix, investing matrix, baking of inlays, and inlay ready for cementing into cavity. He also presented two patients for inspection.

Case I showed two large inlays set in mesial cavities extending from above the gum line to and including about one-fourth of the incisal edge, and showing the perfection of color, formation and adaptation to the cavity.

Case II. Patient with four inlays, one in the mesial surface of left central, including incisal corner; one on the mesial surface of right central, irregular cavity extending from the cervical margin to and including about three-quarters of incisal edge; one in distal surface of right central, simple proximal filling, using Brewster body; one in the mesial surface of right lateral, irregular cavity extending from the cervical margin to and including at least one-half of incisal edge. All inlays, except the one designated, made of Jenkins' body, showing the perfection of adaptation and coloring, the perfect restoration of contour and incisal angle obtainable with this material.

Clinic of Dr. C. R. Taylor, of Streator, Ill.

This clinic was a banded Davis crown, second left upper bicuspid, using platinized gold for band and cap, soldering the band and cap with 22k plate gold, and contouring band and cap with 22k solder. A little moist whiting is placed in the cap, after being soldered with the plate gold, to prevent the 22k solder from flowing inside of the cap. The chalk simply forms a cloud over the inside of the cap, and thus does not injure any investment. The band is gauge 32, cap 34. When the root is prepared for the pin, it is countersunk with a bur slightly larger than the diaphragm of the Davis pin. The cap is placed in position on the root, the pin is passed through the holes in the cap, and driven up so as to countersink the diaphragm of the pin into the top of the cap. Both are removed and placed on the soldering block, which has a pin-hole; pin is tacked to the cap with a small piece of 18k solder; both are returned to the root and properly adjusted, then taken off and returned to soldering block and properly soldered, and top of cap stiffened with 18k solder. If care and judgment are used, neither impressions nor investments are needed in making the cap or adjusting the Davis crown for the ten anterior teeth. Platinized gold plate was used, because solder does not so readily flow over platinum, and thus it is possible to make a cap without investing it. (This clinic was not finished, because the teeth required to be separated enough to get a suitable-sized crown in position.)

Clinic of Dr. Henry C. Raymond, of Detroit, Mich.

This clinic consisted of porcelain inlay work, showing cavity formation, contouring of inlays, color scheme and staining, and perfect fit and margins, so that finishing after inlay is set may be dispensed with.

Clinic of Dr. Stanley Reed Holden, of Duluth, Minn.

This was a disto-occlusal gold filling in an upper right first bicuspid. Preparation of cavity after the method of Black; Wedelstaedt method of building the filling, which consisted of the use of cylinders of non-cohesive foil in the seat of the cavity as the beginning of the filling, binding these in and finishing with cohesive foil, the latter being anchored in step portion of cavity and gradually extending back and over the non-cohesive cylinders.

Clinic of Dr. U. D. Billmeyer, of Chattanooga, Tenn.

TECHNIC OF PULP ANESTHETIZATION.

1. Demonstrated the method by use of models.

2. Removed a vital pulp for a patient, applying the same method.

The following is a description of the operation:

Grind to a powder hydrochlorate of cocaine crystals on a glass slab with a spatula, incorporating enough carbolic acid (95 per cent) to make a thick paste. Apply this paste freely over the exposed pulp and inject by placing beeswax (not baseplate wax) in the cavity in such a way as to bring it well over the borders of the cavity, when gentle pressure can be applied on the wax over the paste and exposure, until the patient shows signs of sensation. Then discontinue the pressure for a moment, until the surface of the pulp becomes slightly deadened, when pressure can be renewed until no sensation is produced, then the pulp is removed with little or no pain.

Clinic of Dr. J. Lowe Young, of Detroit, Mich.

This clinic consisted of a demonstration of the painless preparation of a vital tooth for a gold cap to be used as an abutment in bridgework, by the aid of cataphoresis.

1. Expose some of the dentine, preferably on the occlusal surface of the tooth. This is easily and almost painlessly done with a knife-edged carborundum disk (kept wet) in the engine.

2. Apply dam and thoroughly insulate, so that current cannot pass between neck of tooth and rubber. Chloropercha is efficient for this, and if a clamp has to be used, it should be thoroughly coated with chloropercha.

3. With negative electrode in hand and positive carrying a small pellet of cotton, moistened with a saturated solution of cocaine placed in contact with dentine, instruct the patient to gradually turn on the current with the other hand. This will usually take from five to ten minutes to get the controller up to one hundred points. It is then left at this point for ten or fifteen minutes, or until such time as the positive electrode can be removed from the tooth and replaced without causing pain. Then remove dam and grind the tooth to shape, which usually requires that all the enamel must be removed.

4. Readjust dam and coat the tooth with silver nitrate, closing up the dental tubuli, thus rendering pulp immune from shock.

from thermal change, or from irritation from phosphoric acid in cement.

Dr. Young has used for several years the S. S. White outfit, with the 18 dry cell battery, but as he could not get an outfit of this kind for his clinic, he had Dr. Price, of Cleveland, use his outfit, which has some desirable advantages over the one he has been using.

Clinic of Dr. Frank L. Smith, of Denver, Colo.

This clinic was on the construction of a soft rubber velum or cleft of the palate; also movement of the roots of the anterior teeth in the correction of a facial deformity, according to the methods of Dr. Case.

Clinic of Dr. James Edward Power, of Providence, R. I.

TREATMENT OF FRACTURED JAWS.

This clinic consisted of demonstrating the various ways of reducing fractures and appliances for holding broken fragments in position. Dr. Power demonstrated the taking of impressions of fractured jaws, the breaking of models and reconstructing of same to make splints upon, demonstrating the making of all kinds of splints, especially the aluminum one, which is cemented on the teeth, the fragments being held in position by virtue of the cement and teeth.

He exhibited a head-band to be used instead of a bandage, and twenty-five articulated models, showing cases before and after treatment.

Two cases were presented to him for advice, one a neglected case of fracture of the inferior maxilla, combined with necrosis and sinus of the face. The other was one where a fracture had been treated, the fragments united, but the patient was unable to open the mouth more than one-quarter of an inch. He prescribed treatment for both of these cases.

Clinic of Dr. Frank T. Breene, of Iowa City, Iowa.

This consisted of a gold inlay; cavity, mesio-incisal right central incisor. Occlusion, direct incisal. Preparation, gingival and incisal steps. Retention, staple of iridio-platinum wire passing through matrix into depressions in gingival and incisal steps. Matrix made of pure gold, 35-gauge; contour of 22k solder.

CLINIC OF DR. A. R. BEGUN, OF DES MOINES, IOWA.

Dr. Begun made a gold filling in a left superior central incisor, involving the distal surface, the entire cutting edge, and about one-half of the lingual surface. He used gold and platinum foil, twelve and thirty, in anchorage, and all of the lingual surface, which extended to about half the thickness of the filling, and cohesive No. 4 for the labial.

CLINIC OF DR. J. MILLS, OF BRANTFORD, ONTARIO.

Gold filling, a combination of swaging and burnishing. The cavity is prepared as usual, and then he varnishes the floor and lower third of cavity with a varnish made of white shellac, two parts, and gum spar, one part, dissolved in pure alcohol, and when dry enough to just stick a little to the fingers, pat in from two to four thicknesses Watt's crystal strip, or other gold, and with a piece of separating rubber or any elastic rubber force the gold into every part of the cavity with one push. After waiting about a minute, he burnishes the gold thoroughly over all margins, and after waiting a minute or so for the varnish to harden, he commences burnishing the filling in, being careful not to overheat the gold, nor to rub too heavily, as the gold will not weld if too much pressure is used. Many makers' gold can be burnished in, but not all. For this purpose he uses Reynolds' and Watt's crystal. He dries out the cavity thoroughly with absolute alcohol before putting the varnish in.

CLINIC OF DR. ALEXANDER JAMESON, OF INDIANAPOLIS, IND.

This clinic was a demonstration of a method of baking a low fusing inlay. He takes a cavity impression with "Archite;" mounts it in a metal ring in a matrix of modeling compound. He places this ring in his swaging device and swages a small sheet or plate of pure gold over it. He takes away the resulting matrix and anneals it, then replaces on cavity impression, and puts a considerable quantity of moss fiber gold upon it, and swages strongly. This gives him a matrix that is unshrinking and unchanging for all baking which he desires to do. With this matrix he bakes his low fusing body over a Bunsen burner. The advantages of this method are absolute accuracy of fit, minimum amount of time expended, and dispensing with a furnace.

CLINIC OF DR. J. W. PUCKETT, OF GENEVA, NEB.

THE COGSWELL CROWN.

A superior central was used which was ground to perfect union, length and articulation, making allowance for a thickness of 28-gauge plate on the lingual surface; then a piece of 28-gauge gold plate, large enough to cover the lingual surface, was bent to approximately fit the lingual surface of the porcelain, and held in position on the porcelain with the thumb while a small sharp instrument was passed through the hole in the porcelain from the neck end of the crown, and a scratch made on the gold plate to indicate where the pin should be attached to it; the gold back was then placed on the asbestos block with the scratch up; the end of the pin was ground to a bevel to correspond with the bevel of the lingual surface of the porcelain, and leaned against the raised part of the asbestos block, letting the beveled end of the pin rest flat on the gold backing at the place indicated by the scratch, and pin and backing were soldered together. The pin was then inserted from the lingual surface of the porcelain, bringing the gold down close to place; surplus edges of gold were trimmed away and backing burnished to porcelain. The porcelain was then placed in the mouth without the pin, and held in correct position, while a drill was passed up through the hole in the porcelain, using it as a guide to insure correctness in starting the opening in the root to receive the pin; the canal was then opened to the correct size and depth for pin; the crown was tried with the pin in position, and, finding that the pin was not quite the correct angle to allow the crown to go up to place perfectly, the porcelain was removed from the pin and the pin was bent with the pliers until the correct angle was obtained, when all went to place perfectly. It was then removed and dried, and a small quantity of thinly mixed cement was placed around the pin between the backing and porcelain, and then the backing thoroughly burnished and polished; it was then mounted with cement the same as any crown, with a fixed pin. The occlusion of the antagonizing teeth comes directly on the head of the pin, thus saving the porcelain.

The actual time required for the operation was forty minutes, but the patient was in the chair five hours, allowing those present to examine the results.

Clinic of Dr. F. L. Marshall, of Boston, Mass.

THE STAPLE CROWN.

The principal difference between Dr. Carmichael's crown and the author's is that he (Dr. Carmichael) burnishes gold into grooves made in the teeth to be crowned, while Dr. Marshall uses a platino-iridium staple. This staple crown he has used for different purposes for five years or more, with very gratifying results.

As to the preparation of any of the six front teeth for the crown, the author says: "Take the enamel fissure bur, have your assistant keep a fine stream of cold water running over the tooth, and quickly cut into the side of the tooth to the depth of the bur. Repeat the same on the opposite side, having the grooves come just back of the contour. Then connect the grooves across the tooth by the use of an enamel bur or a small stone. If the articulation is very close, grind off enough to allow for the thickness of the crown. Then knife-edge your tooth from the cross groove to the point as you would an artificial tooth before backing up.

"Next select your piece of platino-iridium wire, a trifle smaller than the bur; bend a right angle on the end long enough to fit one proximal groove. Take the distance across between the grooves in your eye, and bend another right angle in the wire at that distance, thus forming the 'staple' which gives the crown its name. Cut the ends of the staple the proper length to fit the grooves, having the cross-bar flush with the palatal portion of the tooth. Now take a thin piece of pure gold, from 30 to 35 gauge, large enough to fully cover the back of the tooth. Take your staple in a pair of pliers, and hold in contact with the piece of pure gold at a slight angle. Solder with 22 karat solder at the point of contact. Bend the gold loosely around the sides of the staple, and trim cervical portion. Place the staple into the grooves, and burnish the gold firmly to one side. Remove and solder. Replace the crown, and burnish all around back of tooth tightly to the opposite side. Remove and solder. Now replace and burnish all around the free edges. Trim off the surplus; remove; flow 20-k solder over the outside of the crown, taking particular pains to leave or to keep the edges of the pure gold to about one-thirty-second of an inch free from solder. These edges are to be burnished tightly to the tooth when the crown is cemented into place. The burnishing is to be done before the cement hardens.

"The construction of a bicuspid or molar crown is very different from one for any of the six front teeth. The first thing to do is to grind off the inner cusp and straighten the walls of the back part of the tooth; then cut the grooves in the anterior cusp just as you would in a cuspid. Cut a band of 22-k gold as you would to make a full crown, only not quite so long. Solder one side of the staple about one-sixteenth of an inch from one end of the band. Place the staple on the tooth. Draw the band around the tooth to the opposite side. Burnish tightly to the neck. Remove; push the free end of the staple back about the distance of one line, so as to assure a tight fit, and then solder. Strike up cusps, preferably of 22-k gold, fit to the top of the band, and solder at the inner point of contact. Put in place on the tooth. Allow the patient to bite firmly to give correct occlusion. Burnish to the cutting edge of outer cusp. Remove; trim and fill the inner cusp with solder up to the cross-bar of the staple. Allow the solder to unite the joints between the cusps, and the band at the outer or buccal cusp. Burnish all around the edges, and the crown is finished.

"The lower teeth are treated in the same way as the upper, only that a smaller wire must be used."

Clinic of Dr. Edward H. Angle, of St. Louis, Mo.

ORTHODONTIA.

Dr. Angle gave a table clinic on orthodontia, which awakened much enthusiasm among those interested in this branch of dental science. It consisted of a large number of very accurate and artistically made models of cases of malocclusion of the teeth before and after treatment. These models represented all phases of malocclusion, and were arranged in classes and sub-classes, according to Dr. Angle's classification of malocclusion. Dr. Angle aimed to prove by them three points:

1. That normal or ideal occlusion was to be sought for in every case.

2. That the full complement of teeth is always necessary for the best results, and that when mutilation has for any reason occurred, the missing tooth or teeth must be artificially substituted.

3. That one appliance, the expansion arch, will accomplish all required movements more easily, more quickly, and better than any other number of appliances.

The results shown after the treatment of these cases were excellent and convincing, and awakened much interest.

Dr. Angle was assisted in his clinic by Dr. Lloyd S. Lourie, of Chicago, and Dr. Milton T. Watson, of Detroit, Mich.

Clinic of Dr. Henry W. Gillett, of New York.

ASEPTIC ABSORBENT POINTS FOR DRYING PULP CANALS.

A bibulous paper point fine enough and stiff enough to follow fine pulp canals, sterilized, and packed in such a manner as to permit of a few at a time being taken from the package without danger of infecting the remainder. A time-saver, very useful in removing any fluid from pulp canals, and performing this office in such a manner as to avoid the bacterial infection of the canal which so commonly accompanies the use of a cotton-wound broach for this purpose. Also useful in applying dressings in pulp canals, originally suggested many years ago by Dr. J. F. P. Hodson. Manufactured by Johnson and Johnson.

KIDDER'S HYDRAULIC CONTOURING PRESS.

Invention of Dr. W. N. Kidder, of Providence, Rhode Island.

The press was damaged and unavoidably absent, so only the different steps of its use could be shown.

In using it the gold shell is first formed roughly to fit the die without attempt at contouring. It is then placed on the die, and the two are quickly sealed with rubber cement into a small rubber bag, and dropped into the water-chamber of the press. When the handle is screwed down, the pressure is applied equally on all sides of the shell and it is forced to an accurate fit on the die at all points. On removal from the press, the die is melted out, leaving the contoured crown ready for use.

Clinic of Dr. F. B. James, of Wilton Junction, Iowa.

Dr. James filled a very large cavity involving the entire mesial third and almost all of the grinding surface of an upper left first molar. He started the filling with Vernon's gold, and finished with pellets, using a mechanical mallet throughout.

Clinic of Dr. Emory A. Bryant, of Washington, D. C.

This clinic consisted of the various methods invented by Dr. Bryant for replacing porcelain facings of crowns or bridges when broken; also his method of constructing crowns and bridges in such manner that the porcelain facings are not subjected to heat in soldering, and replaceable in case of breakage, equally as strong and as artistic as in the original denture. He showed his removable porcelain bridge, gold base, partial lower gold plate, with clasp for retaining same in place, porcelain attachments, and bridge repair instruments, clasp pliers, crown pliers, flask holder, etc., all of which were his own inventions.

Clinic of Dr. William Crenshaw, of Atlanta, Ga.

This clinic consisted of restoring to original form the right upper first and second bicuspids, and the adjoining molar, by the use of the contour matrix of the author's device. The operation embraced the knuckling or contouring of the teeth, so as to restore natural contacts and, at the same time, preserving the interproximal space. It further embraced in the making of the fillings proper the placing of soft gold, fully condensed, halfway or further up the proximal wall, finishing with cohesive gold.

Clinic of Dr. Max. M. Eble, of Louisville, Ky.

This was a table clinic on two different models, on one of which Dr. Eble demonstrated the use of a matrix for filling teeth with non-cohesive gold foil, as a lining, in connection with tin foil on cervical margin, and finishing same with cohesive gold foil. The other model demonstrated the use of the matrix in plastic fillings, showing a finished filling (except the subsequent polishing) at the cervical margin, when matrix was removed.

Clinic of Dr. C. Howard Merritt, of Auburn, Maine.

PORCELAIN INLAYS.

The work, which consisted of two fillings, was done in the mouth of a lady patient, one in the mesio-proximal surface of a left upper central from gingival margin to the cutting edge; the other restoring lost contour of a right upper lateral, the mesio-proximal half of tooth. The teeth were difficult to match, hence Dr. Merritt had to take a shade a trifle darker and bake out a little of the color. When cemented into place, the color was perfect, and the line of union was not visible. The leading porcelain men pronounced it the most perfect work they ever saw in this line. He was to use both high and low fusing bodies, but owing to the unsatisfactory working of the electric furnace, both inlays were made of the Jenkins low fusing enamel.

Clinic of Dr. Marvin L. Hanaford, of Rockford, Ill.

This clinic consisted of the insertion of a gold filling in a mesio-occlusal cavity in a first left upper molar, and was designed to illustrate a conservative application of the principle of extension for prevention.

The patient being considered immune to caries, the gingival margin of the cavity was extended only to reach sound tissue; the lingual wall was cut sufficiently to be clear of contact with adjoining tooth; buccal wall, being thin, was cut away to allow for a considerable thickness of gold being built over it. All margins were beveled and floor of cavity made everywhere flat; general shape retentive. A matrix of thin steel was applied, ligated with silk, and further secured by packing of temporary stopping. Filling was begun with large pellets of non-cohesive gold and completed with loose rolled cylinders, annealed with Kerr's electric annealer, condensed by means of rapid blows of hand mallet; space for finishing was gained by Ivory separator. Contact point was perfectly restored and filling throughout seemed to be satisfactory.

A point of minor importance which seemed to be of particular interest to some was the retention of the rubber dam by means of two beads, slipped on to the ligature, tied with a single knot, and so arranged that, when passed around the tooth, one bead should appear on the buccal and one on the lingual surface, securely holding the dam without the use of clamp.

Clinic of Dr. George H. Wilson, of Cleveland, Ohio.

VULCANITE.

This clinic consisted of three demonstrations: Vulcanite base-plate; string for festooning, and heavy tin foil for finishing.

The claims for the method are: More perfect vulcanization with a hard metallic surface finish. The base-plate being of black or uncolored rubber, there is little danger of mercurial poisoning. Having a metallic surface finish, it is more easily kept clean. It reproduces the sugar of the mouth, which nature designed to assist deglutition and enunciation. The method in every way meets the requirements of mechanics and æsthetics.

A full description and illustration of the method were published in the March, 1903, number of *The Dental Summary.*

Joint Clinic of Dr. F. J. Capon, of Toronto, Ontario, and Dr. W. A. Capon, of Philadelphia, Pa.

A joint clinic was given by the Capon brothers on porcelain crowns, sections and inlays. Being a table clinic, it afforded the opportunity of demonstrating the process and the baking of inlays for the more simple labio-marginal cavities. Then they carried their audience to the more complex work of sections for corners of contours, showing their methods of retaining the same by platinum staples, wires and pins.

They also showed samples and demonstrated "media" for the retention of shallow inlays, crowns and porcelain veneer faces or broken bridges, a new invention of Dr. C. H. Land, of Detroit. The attachment is doubtless powerful, as when struck with a hammer the porcelain and the cement broke, but did not part or cleave the porcelain from the cement. The porcelain "jacket," the porcelain cup, crowns and some removable porcelain bridges were shown, and demonstrated to the satisfaction of the audience.

The following morning Dr. F. J. Capon was asked by the committee to give a practical demonstration in the mouth. The patient was a boy, about sixteen years of age, with a mesial corner broken from the right central. A platinum matrix with Close's body as a base and Brewster's enamel was used. The shade matched perfectly, and the joints were all that one could wish. His brother assisted by answering a number of questions, which are always expected when a clinic is given of this nature.

CLINIC OF DR. WALTER N. MURRAY, OF MINNEAPOLIS, MINN.

This clinic consisted of the placing of a gold inlay in an upper right first molar (devitalized), crown cavity, involving the entire occlusal surface. Time, two hours.

CLINIC OF DR. MCFERRAN CROW, OF VERSAILLES, KY.

This author showed a method of using pinless rubber teeth for bridge and crown dummies. After selecting the teeth to suit the case, he makes cups of 22-k gold plate or pure gold, 30-gauge, by burnishing the piece of gold to the under surface of the tooth; and then turns up the gold against the lingual and buccal surfaces. Now, with a small pair of shears he cuts the gold along the angle of the fold at each corner, burnishes the sides to the tooth, laps the corners, and with a sandpaper disk in the engine trims off all surplus gold and solders the corners. With the tooth in place in the cup, he punches through the gold into the hole underneath, inserts a post of gold wire or other suitable metal, and catches it with solder. The tooth is now ready for setting up and waxing to the abutments. He removes the porcelains before investing to solder, and sets them in the cups with cement or gutta percha, when the bridge is ready to place in the mouth.

Clinic of Dr. Oliver Martin, of Ottawa, Canada.

HOW TO MAKE GOLD CROWNS.

Prepare tooth or root in the usual way. Take measure with wire, cut band, one-sixty-fourth of an inch longer than the measure; bevel edges, lap, apply borax solution, and sweat together in Bunsen flame; try on root, cut to fit gum margin, contour with pliers, try on again, and observe articulation; trim top of band to allow free occlusion of the teeth with band in position on root, also lateral motion of jaw. Next heat over flame a piece of impression compound, place in top of band and have patient bite, holding teeth together half a minute till hard; remove band with the compound in it, carve up for cusps, leaving articulating surface, as shown on compound; pour some plaster on a glass and place crown band with compound top into it; when hard, remove. A small taper ferrule is now driven over the impression in the plaster and fusible metal poured in; take die thus obtained, and strike up top for crown on piece of lead; fit this over the crown band with compound still in it; trim, and mark with a file edge of both top and band; now remove compound from band; clean both top and band in acid; put top on, having marks together; use twisted wire around tweezers, which holds them together, solder from inside with Bunsen flame, filling cusps at the same time; polish and cement on. Articulation is perfect. This can be made and cemented on in one hour.

Clinic of Dr. J. S. McCurdy, of Fort Wayne, Ind.

PORCELAIN INLAY.

Dr. McCurdy demonstrated a method of making inlays for cavities difficult of access. He prepares the cavity cup-shaped, with well-defined edges. He vaselines the tooth and cavity, and takes an impression with pink sheet gutta percha. He fills the impression with amalgam, and, when thoroughly hard, swages the platinum foil, 1-1000 of an inch in thickness, over the amalgam die, forming an accurate fitting matrix in which to bake the porcelain inlay.

Clinic of Dr. J. L. Sweetnam, of Manistee, Mich.

This clinic consisted of a demonstration by models of a method emphasizing the importance of preserving the inter-proximal spaces. For gold crowns two bands are used; the first, a narrow one, is driven under the free margin of the gum, an impression is then taken with plaster, the band removed and placed in proper position in the impression, and a model run with Mellotte's metal. The case is then put into an articulator, and the second band fitted snugly over the first one. Now, with the use of a burnisher, from the inside the bands are forced against the adjoining teeth, where the point of contact is desired. The cusps having been struck up, are now filled to make the proper occlusion; the case is then removed from the articulator, and the model fused out of the bands. The bands are then soldered together, and the cusps wired to place and soldered. In this way a beautifully contoured crown is produced, and an absolute fit to the root is insured. It is not claimed to be an easy or quick method; but if beauty of outline aud accuracy of fit are desired, the extra time required to do such work is fully compensated for. The same result is more easily obtained with porcelain crowns by using rubber plate teeth instead of facings.

Clinic of Dr. D. O. M. Le Cron, of St. Louis, Mo.

This clinic consisted of the carving of a bicuspid crown and baking in a Turner gasoline furnace. It consisted of backing up a facing with porcelain body, using Close's body for first bake, and then finishing with one of Brewster's enamels, making a finished crown ready for the mouth in two bakes.

The object of this clinic was to show how easy it is to make a porcelain crown, and also that the gasoline furnace can do just as good work as the electric furnace, and in less time. Besides, gasoline can be used where there is no electric current to be had.

CLINIC OF DR. D. O. M. LE CRON, OF ST. LOUIS, MO.

APPLICATION OF PORCELAIN IN DENTAL PROSTHESIS.

Dr. Le Cron gave a complete exhibit of cases from full dentures, bridges, crowns and inlays; also of high fusing bodies used in construction throughout. Special features of the exhibit were fused samples of all high and low fusing bodies now in use, showing their comparative degrees of shrinkage, and the exact degree of temperature required for fusing each. He also demonstrated a method of mixing the gum enamel bodies, enabling the matching of various shades of mucous membranes; also a method of repairing Richmond facings broken in bridges and crowns, by burnishing 1-1000 platinum in space, drilling parallel holes in backing, adjusting pins through platinum, removing same, selecting proper shade of bodies, carving to shape, fusing in furnace, putting on platinum matrix, cementing to place, resulting in a proper fitting facing.

CLINIC OF DR. ALFRED OWRE, OF MINNEAPOLIS, MINN.

This clinician gave a practical illustration of some of the cardinal principles of operative dentistry, such as extension for prevention (outline form), contour, contact, condensation, interproximal space, and gum tissue, etc., shown in the mouth of a patient twenty-three years of age.

CLINICAL DATA AND MATERIALS USED:

Right upper central incisor, mesial cavity, filled four years ago with De Trey's solila gold.

Right upper 1st bicuspid, disto-occlusal cavity, filled four years ago with De Trey's solila gold.

Right upper 2nd bicuspid, mesio-occluso-distal, filled four years ago with De Trey's solila gold.

Right upper 1st molar, mesio-occlusal cavity, filled four years ago with De Trey's solila gold.

Left upper central incisor, mesial cavity, filled four years ago with De Trey's solila gold.

Left upper 1st bicuspid, disto-occlusal cavity, filled two years ago with De Trey's solila gold.

Left upper 2nd bicuspid, mesio-occluso-distal cavity, filled six months ago with S. S. W. Moss Fibre gold.

Left upper 1st molar, mesio-occlusal cavity, filled six months ago with Morgan Hastings foil.

Right lower 2nd bicuspid, disto-occlusal cavity, filled nine years ago with amalgam.

Right lower 1st molar, mesio-occlusal cavity, filled nine years ago with amalgam.

Right lower 2nd molar, occlusal cavity, filled nine years ago with amalgam.

Formula: Ag., 54; Sn., 37; Cu., 5; Au., 4=100.

Left lower 2nd bicuspid, disto-occlusal cavity, filled six months ago with amalgam.

Left lower 1st molar, mesio-occluso-distal cavity, filled six months ago with amalgam.

Left lower 2nd molar, mesio-occluso-disto-buccal cavity, filled six months ago with amalgam.

Formula: Ag., 60; Sn., 33; Cu., 6; Zn., 1=100.

DR. FREDERICK W. ALLEN, of Philadelphia, Pa., exhibited a mechanical section grinder for the preparation of microscopical sections, and demonstrated the use of the instrument. This instrument was described in detail in a paper read by Dr. Allen before the Pennsylvania State Dental Society, July, 1902, and published in the *Dental Cosmos*.

DR. GEO. A. LOUQUE, of New Orleans, demonstrated a new system of crown and bridge-work, the plans and specifications of which are too long for reproduction in this report.

CLINIC OF DR. EUGENE R. WARNER, OF DENVER, COLO.

ADVANTAGES OF THE DICKINSON MATRIX RETAINER IN CONTOUR FILLINGS.

The retainer by means of its plough-shaped beaks acts as a wedge between teeth, causing slight immediate separation, and at the same time holds firmly in position a thin, smooth matrix of steel, copper, or other material. The matrix can be withdrawn laterally without fracture of filling, especially in amalgam. The thorough condensation of either gold or amalgam against the walls of the matrix increases the wedging, so that the completed cases give not only a finished surface, but also a strong contact with the adjoining tooth, a point so often overlooked in the protection of the interproximal space.

Clinic of Dr. W. H. Todd, of Columbus, Ohio.

This clinic consisted of the exhibition and demonstration of a splint for retaining loose teeth, made by banding with 22k gold plate. After the several bands are soldered together, an impression is taken with the bands upon the teeth, with modeling composition, into which ideal fusible alloy is cast to make a die. Modeling composition is used for the counter-die to swage a 22k 30-gauge gold back, which is soldered to the lingual surface of the bands; the distal part of the bands is then cut away, leaving a wedge-shaped piece between the teeth.

Clinic of Dr. C. S. Bradley, of Beloit, Wis.

The author demonstrated the value of attaching a tube to the pin of a crown, to give additional strength in cases of frail roots. The root is prepared in the usual manner, and a trephine bur is used to cut a groove close to the root canal. In this groove a tube is fitted accurately and soldered to the pin. A platinum floor is burnished to the root, and crown constructed in the usual manner.

Clinic of Dr. Harry P. Carlton, of San Francisco, Cal.

Dr. Carlton demonstrated a new and ideal system of backings for attaching facings in crown and bridgework. It is a box backing with holes punched in the face of the backing next the facing for the pins. When the bridge is soldered the facings are cemented on, so that in case of a broken facing a new one may be adjusted in a few minutes. The edges of the backings are of pure gold to admit of easy burnishing, while the face is of clasp metal to give strength. Dr. Carlton also showed a special matrix, the invention of Dr. Hinaker, of San Francisco.

CLINIC OF DR. S. MOYER, OF GALT, ONTARIO.

Dr. Moyer gave demonstrations of the administration of narcotile for general anæsthesia. Three patients presented themselves, all of whom were anæsthetized in about ninety seconds each. The duration of the anæsthesia was two, three and five minutes, respectively, after which consciousness returned almost immediately.

JOINT CLINIC OF DR. F. R. MCCLANAHAN AND DR. F. M. SPARKS, OF RUSHVILLE, IND.

These gentlemen demonstrated the use of the Logan crown in prosthetic work. An upper denture of Logan crowns on gold was exhibited and received many favorable comments. The method of procedure was quite simple: A gold plate is swaged in the usual manner, and by placing it in the mouth with a few plain teeth waxed in place, the length and width of the Logan crown are ascertained; the pins are now cut from the crowns, and the countersunk portion partially ground away. Over the stub of the pin remaining in the crown burnish a piece of pure gold, about 32 gauge, and grind the remaining portion of the pin down to the gold backing. Articulate the teeth, grinding the occlusal or crown surfaces, when necessary. The crowns are now firmly waxed in place, and the case invested. The investment should be rather heavy, to prevent warpage of plate. The solder should be placed between each crown and the plate, upon the lingual surface; the case carefully heated up and soldered. Finish by using pink rubber for the gum.

CLINIC OF DR. G. LENOX CURTIS, OF NEW YORK.

OPERATING FOR THE REMOVAL OF AN IMPACTED THIRD MOLAR.

Dr. Curtis said: "The necessity for its removal and the danger attending should be considered.

"First study the disturbing influence upon the proximating tooth and the adjacent parts. Most prominent among these influences is the decay of the distal surface of the second molar, due to impacted debris, and inability of the patient to keep its surface clean. This condition may so irritate the soft tissue as to produce inflammatory action sufficient to bring about disease of the alveolar process, which may extend in almost any degree to the adjacent parts. We, no doubt, have all seen extreme examples of this, i. e., where a greater part of the jaw was involved and was sacrificed, when the tonsil, pharynx, parotid, and sub-maxillary glands were involved and the jaws locked, or where blood poisoning and even death of the patients were the results.

"Other examples are, when the tooth is incompletely erupted and gives rise to frequent inflammation of the gum by reason of the occluding tooth impinging upon the gum, the decay of the tooth itself, which cannot be filled by reason of the inaccessibility of the cavity, and the suffering due to pulpitis and reflected disturbance. These are among the reasons why mal-positioned teeth should be removed. The dangers attending their removal are not great. The principal danger is paralysis due to the injury of the nerves of the jaw and tongue.

"The cicatrix caused by the operation may also be responsible for this annoying malady. This condition, however, is usually temporary and is gone by the time, or soon after, healing is complete. It may last indefinitely, but rarely to a troublesome extent, and depends largely on the general health of the patient. When the vitality is low this condition is likely to manifest itself and become annoying, as small bills do which have accumulated when one's bank account is strained. Preventive medicine is here, as in general disease, the proper treatment. There are more things to be considered than merely getting the tooth out; each case must be treated by itself and according to the conditions present. No set of rules can be applied to all cases. The operator must take into consideration whether the deranged tooth can be made serviceable. It may be found that the second molar is so badly diseased that its removal will allow the third molar to erupt and be utilized to the benefit of the patient. It was an old custom, and one which I regret to say is now sometimes resorted to, to remove the second molar so as allow direct access for the removal of the impacted tooth.

"The method employed for the operation depends upon the position in which the tooth lies. It is said to be usually found external to the line of the jaw. I have found these teeth lying immediately external to the tonsil, at the neck of the condyloid process, external to the maxillary tuberosity, within the antrum of Highmore and in various portions of the ramus. I have even found them completely inverted with the masticating surface resting squarely over the inferior dental canal. These, however, are among the exceptions, and I cite them merely to show how carefully one should look for the cause of disease in these parts when the third molar is missing. In this work, as well as in all your undertakings, it is better to be conservative. This operation requires as much good judgment and skill as is necessary in an antrum or mastoid operation, and much more than in the amputation of a limb. No one should be better qualified to do this work than a dentist. With his knowledge of the mouth, and his dexterity in working within it, he should be able to convert what is often made a major operation into a minor one.

"In removing these teeth I usually incise the soft tissue which covers the tooth or in any way tends to retard its removal. To do this I prefer to use a pair of sharp scissors which crushes the vessels together and causes less bleeding than the knife. The use of the scissors lessens the danger of sepsis, by preventing the pus or clots being carried into the vessels. I next remove with suitable burs and dental engine the bone which holds down the tooth. Here the greatest care must be observed, lest the soft tissues on the lingual surface be disturbed, as paralysis of the tongue is liable to follow such a wound. I aim to keep within the periosteum, except that portion which is removed with the bone lying over the tooth. When this is accomplished, removing the tooth is the next step and is by no means the easiest part of this perplexing operation. The Physick forceps and the elevator are generally employed. In most cases I find the elevator better adapted. When the Physick forceps are used the second molar must form a fulcrum upon which to pry the tooth. When the elevator is used a depression is drilled into the bone under the front portion of the tooth at a proper angle so that when it is forced under the tooth it can better be raised from its bed. When the bone about the tooth is necrosed or carious, it should be burred or curetted away, and when the wound is cleansed of the debris it should be tightly packed with antiseptic gauze, not alone for the purpose of preventing sepsis but for checking hemorrhage. This packing may be removed on the following day. Thereafter the wound should be lightly packed so as to preserve cleanliness and facilitate granulation, until the cavity in the jaw is filled and the wound healed. It must be borne in mind that when a wound is tightly packed granulations will no more form than will grass grow under the pressure of a board.

"In this patient the tooth lay parallel with the jaw, butting directly against the roots of the second molar. This man has suffered in consequence of the inflammation caused by necrosis of the bone around the tooth. As you see, the face is swollen and the patient is unable to open the mouth sufficiently to masticate his food properly."

Dr. Curtis then incised the gum, drilled away the bone and removed the tooth and dead bone as described above. The patient returned the following day for the dressing of the wound, at which time a lighter dressing was put in.

Dr. Curtis also operated for Disease of the Antrum of Highmore.

"This is too complicated a subject to more than touch upon at this time. The pathological anatomy alone would occupy the entire time allotted to me for this clinic. The diagnosis of the case before me has already been made and it has been under treatment for several months. One of the best methods to determine the existence and extent of disease in this cavity is to place a small electric lamp within the mouth. If the antrum is diseased it fails to transmit the lamp's rays through the jaw. In order to secure transillumination sufficient to give the face a 'Jack o' the Lantern' appearance the room should be darkened. This, as at the present time, is not always feasible, so we will throw over the head of the patient and the one who examines the case a black rubber blanket or a coat, so as to exclude all sunlight. By this means we do little more than outline the area of mal-circulation and prove the existence of disease. To ascertain the nature and extent of the disease the antrum must be opened into. The examination of this case reveals but little disease, yet enough to explain why the treatment so long continued failed to effect a cure. In the anterior portion we find a few mucous cysts which alone are probably insufficient to maintain this trouble, but immediately over the third molar the periosteum is denuded and possibly is pus-bearing. Another and perhaps the principal reason for the failure is the fact that the opening into the antrum was made at the most dependent part, i. e., through the socket of a tooth. By the constant downward drainage of the mucous the ciliary epithelium which lines the antrum has become matted and its action paralyzed.

"During the irritating stage of the treatment the quantity of mucous is increased. This not only causes a dull and full feeling in the antrum, but becomes infected and maintains a purulent condition. To obviate all this, I found (about 18 years ago) that by entering the antrum through an opening made at the base of the molar and by packing the antrum with gauze, after the disease was curetted away, healing was greatly facilitated. The gauze absorbs the moisture, and when granulation is complete the epithelium will be found healthy enough to perform its function. The time required for this depends somewhat upon the character and extent of the disease, but particularly upon the physical condition of the patient. Usually from two to eight weeks are required. The dressing may be repeated two or three times a week, and when the membrane is formed the wound may be gently douched, daily or twice daily, with some antiseptic solution. I prefer electrozone, a teaspoonful to a glass of warm water. Gradually lessen the number of treatments as the mucous membrane strengthens. I usually find that by the time the wound in the jaw is closed the membrane has sufficiently recovered itself to require no further assistance. The first gauze dressing should be tightly packed, for the two-fold purpose of preventing a second hemorrhage and for its stimulating effect upon the mucous membrane. In case there is little bleeding upon its removal I have found that if the antrum is filled with aristol it forms a good support for the newly forming blood vessels and that they are held close to the walls while the work of reproducing the membrane goes on. This method greatly facilitates rapid granulation and healing. On account of the roughness of the gauze and the tendency of the vessels to form into it, these delicate vessels are torn and their formation retarded.

"The aristol may be removed in one or two weeks, but it may be found necessary to repeat it. As soon as the denuded surface is covered (which fact can easily be detected by a large probe in well-tutored fingers), doucheing may be established. For this I prefer the Moffatt syringe. Great care must be exercised here lest the force of the solution breaks down the vessels, and for the same reason frequent examinations should be avoided. When bleeding follows the examination extra precaution should be taken by more frequent doucheing so as to prevent the formation of pus. Like in this case before us too much treatment is often given. The mucous is often mistaken for pus and the case hangs on indefinitely. Should pus appear inject a few drops of tincture of iodine into the antrum, trying to cover the entire surface. After doucheing the wound force all the solution out before dismissing the patient. This may be accomplished by a blast of air. The Moffatt syringe can be used for this purpose. To facilitate drainage have the patient lean forward. A drainage tube in the antrum is an abomination. The gauze will be found sufficient to take up the fluid. The wound should be dressed sufficiently often to practically keep it dry.

"I find cocaine to be the most satisfactory anæsthetic. I employ this in most of my operations. Less time is occupied and the patient is not only in control of himself but is ready to leave the operating room and care for himself as soon as the operation is over. I prefer a saturated solution of cocaine, first giving the most reliable antidote, volasem. Then I inject into the soft tissue where I intend opening into the antrum a drop of cocaine, and as soon as the parts are benumbed I continue the injection until anæsthesia is complete. As soon as sufficient bone has been removed to allow the introduction of the point of the hypodermic needle, I inject several drops into the antrum. If, however, the antrum should be filled with fluid, it should first be emptied and the cavity thoroughly douched and dried. Then with the Moffatt syringe flush out the cavity with cocaine, using as much as a drachm if required. In from two to four minutes the parts are usually ready for a practically painless operation. This allows a completion of the work in from five to twenty minutes, depending upon the extent and nature of the disease. As you have seen, a very slight pressure of a sharp curette is required to remove the mucous cysts and but little more where the periosteum is denuded. It requires gentle scraping just to stimulate its action. The edges of the soft tissue surrounding this denuded surface should then be freshened. In these chronic cases I gently curette the entire surface of the antrum and then tightly pack it with iodoform gauze for its stimulating effect. This is followed by a healthy ciliary growth.

"In cases of simple suppurative inflammation one cleansing with dioxygen, full strength, and packing in the above manner, followed by daily doucheing, are usually sufficient to effect a normal condition. Dioxygen should rarely be used owing to its destructive tendency on granulations, except to cleanse the wound and check the hemorrhage at the time of operation. The use of this in after treatment is one of the prime causes of failure. I rarely ever find pus in the antrum following the operation. To reduce the swelling of the face, I recommend ice bags, applied frequently enough to keep the side of the face cool. This treatment is also effective in lessening pain."

Dr. Curtis also demonstrated a new portable high tension coil and ozone generator.

"'For several years I have been experimenting with a high tension portable coil which is attached to the street main of 110 or more volts. The current is multiplied to one million (1,000,000) volts, while the amperage is reduced to the fraction of one ampere. The object of the apparatus is to produce ozone for therapeutic purposes. It apparently has but a single pole, the atmosphere being the negative pole. To the coil are attached ozone generators, inhalers, Geisler and X-Ray tubes. The apparatus is portable and can be used wherever there is an incandescent current, or the current may be supplied from a battery; it is therefore adapted to sick room practice. The current and ozone, by this device, may be carried into and through the body, oxidizing pathogenic conditions, re-establishing nutrition, and restoring the blood to normal. There is no shock nor unpleasant feeling to the patient. This method, as demonstrated by five years' active practice, in which many diseases have been treated, is probably the most effective of any now in vogue. It appears to be equally advantageous in the treatment of acute and chronic cases. It quickly reduces fevers, controls penumonia and diseases of suppurative character, and increases vitality. By passing the electrode over the body, superficial and deep-seated congestions may be located, and within an unusually short period normal circulation is re-established. This fact has been demonstrated in the treatment of meningitis, pneumonia, tuberculosis, neuritis, etc., and the long chain of affections arising from auto-intoxication is virtually controlled. Sufficient ozone can be generated by this device to quickly disinfect the sick room or hospital ward. This is one of the most effective methods of successfully treating facial neuralgia and suppurative inflammation of the face and jaws. I have never seen anything equal the oxidizing influence of the violet ray in reducing inflammation of glands."

The demonstration of this powerful and yet gentle and easily controlled apparatus was greatly appreciated by the audience.

Clinic of Dr. Weston A. Price, Cleveland, Ohio.

Subject: "The Apparatus and Technique Necessary for Successfully Applying Cataphoresis for Desensitizing Sensitive Teeth."

The purpose of the clinic was to demonstrate the simple reasons for the very general failure of the profession with cataphoresis, and show how one can have almost universal success. Owing to their crush of duties the executive committee had not been able to provide a patient, so the announcement was made before the meeting that a dentist was wanted as patient who had sensitive teeth, and preferably one who did not believe in Cataphoresis. Dr. Cecil Trotter, of Toronto, claimed to fill all the requirements and offered himself. The application was made to a mesial cavity in the left cuspid. The rubber dam was adjusted, and S. S. White's low heat sticky gutta percha was packed between the teeth to insulate the joint of the rubber at the neck of the tooth and a distal gold filling in the adjoining lateral.

Very many failures have occurred from faulty insulation. I believe all the apparatus without exception heretofore available had these two principal condemning faults, viz.: First, that they had no measuring instrument that would show clearly just the amount of current that was being used. This is usually only a few hundred-thousandths of an ampere. No instrument heretofore available would show this. This measuring instrument is thirty-two times as sensitive as the S. S. White, one hundred and twenty-eight times that of the Chloride of Silver Dry Cell Battery Company's instrument, and over three hundred times that of the Van Woert and McIntosh. Most of the outfits offered the profession had no measuring instrument at all. Experiments and experience have shown that three-tenths of a milampere is a maximum safe current for single rooted teeth, and four-tenths for a two or three-rooted tooth, unless you wish to remove the pulp. Without a measuring instrument too much current can be used after the pulp becomes anæsthetized, hence it is a necessity to measure the dosage. The measuring instrument also shows at once a bad insulation or a break in the current, of a faulty connection.

Second. The other condemning fault of the apparatus heretofore available was that the current could not be increased gradually enough to comply with the requirements of the sensitive tooth structure, and hence pain and discomfort were produced in making the application, which does not occur with this if properly operated. (These points were thoroughly demonstrated on the patient.)

The solution used was a saturated solution of cocaine in distilled water so that we might have nothing else present to carry the current. The application was made for fifteen minutes, when the excavating was done with dull burs by a disinterested party, Dr. Ebble, of Louisville, and although the tooth was very sensitive before, it was without sensation now. This condition of anæsthesia lasts from ten to sixty minutes. The result was apparently perfectly satisfactory to all who saw it, and particularly to the patient, for he later secured one of the instruments because of the success of this operation, and writes that it is giving excellent results in his own practice.

Some important points were brought out which are now established beyond controversy by the many using this outfit. Among them were these: that much time is actually saved in the total cases if properly managed, viz., to apply to one tooth while filling another where convenient; that all teeth that can be insulated can be painlessly desensitized if the pulp is not putrescent; that a large number of dentists who were bitterly prejudiced against cataphoresis after using the apparatus heretofore available, are exceedingly enthusiastic over it after using this apparatus.

By request this clinic was repeated on the second day.

THE ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held at Hotel Stratford, Jan. 27, 1903, with the President, Dr. E. J. Perry, in the Chair.

Dr. P. J. Kester read a paper entitled "Evolution in Dental Practice."

DISCUSSION.

Dr. J. E. Hinkins:

I had judged from the title of the paper that it would be a little different from what we have heard, although it has impressed me very much. There has been a great deal of work done along this line. When I was in Paris two years ago I visited the laboratory of Dr. Michaels, and spent some time with him. As I have said before, and I repeat it to-night, his experiments did not impress me deeply, because they lacked systematic tabulation. They were in no way scientific, as compared with the research work that has been going on and is going on in the physiological department of the Chicago University, also in the Johns Hopkins University of Baltimore. In the chemicals, etc., that he used, he did not employ specific quantities in his chemical agents, from what I could learn, and therefore it did not seem to me that his work was in line with the best thought and the modern technique of the day. On my return home I went to the Physiological Laboratory of the University of Chicago, and had a talk with Professor Loeb and Dr. Webster along these lines, and they seemed to think it was a question that needed a great deal of elaboration and research. It has been the custom with some of our leading physicians of the United States for many years to look upon a chemical analysis of the saliva as important in the diagnosis of disease, just as a chemical analysis of the urine is very essential, and yet when we come to analyze the saliva, we reach a very complex question.

I have in my own crude way, with the aid of chemists at the University of Chicago, probably analyzed over one hundred salivas of different people. As I have no notes with me this evening, I cannot speak positively, but I think I made as many as ten or twelve analyses of the saliva of the same patients, and I have failed to obtain two analyses alike. For instance, a patient comes into your office for whom you are going to insert a large gold filling, an inlay, or a crown. You take from three to six centimeters of saliva, using the modern technique, and you seal it in a tube with cotton to make it sterile. You go on and work on that patient for an hour or an hour and a half, and when you get through putting in the inlay or gold filling, if you take another test tube, secure some of the saliva from the same side of the mouth, and go through the same technique as before, and analyze the saliva, say two or three specimens, you will find they are just as different as if the saliva had been taken from the mouths of two or three different people. What these physiological changes are, and whether they are due to the physical strain of the patient while in the dentist's chair, or to the nervous strain to which they have been subjected, or to the atmosphere, or what-not, we do not know, and that question has not as yet been definitely solved. I think food has a great deal to do with it. Take a person and put him on a meat diet, and make an analysis of the saliva, you will find the analysis will be entirely different from one made of the saliva of the same patient if put on a vegetable diet. The saliva seems to be so closely associated with the general physiological and pathological constituents of the system, that they both work together, and it is a difficult question to make an analysis of the saliva, because the substances we have to seek are in such small quantities that the least contamination may change the entire analysis or the entire reaction.

I regret very much that I did not have time or opportunity to look over this paper before it was read, because it appeals to me very strongly, and I would like to have discussed it more thoroughly than I have done. I do not feel qualified to do justice to it on such a short notice.

DR. J. W. WASSALL:

The general idea of the paper is one, as Dr. Hinkins has said, which is being worked upon by a few investigators, and already there are results. The theory that some teeth in themselves are not more subject to decay than others is one I cannot accept. I cannot help believing that the teeth in the mouths of different individuals have variations in their inorganic and organic constituents. Chemical analyses and all the different measures for determining the proportion of animal to inorganic matter may not as yet be sufficiently accurate to demonstrate that fact. Of course we know that there are numerous individuals whose mouths are pathological six days out of seven, or perhaps seven days out of seven, and those are the mouths in which we see the ravages of decay going on in such a manner as to make us feel that it is impossible to arrest the process. I am one of those who believe that the personal care of the mouth and of the teeth will go far toward preventing caries, even in those individuals who are very much subject to it. I have seen many cases in my own practice where the patients themselves, who have presented these fearful conditions of the mouth and of the teeth, have succeeded in entirely stopping decay by their own efforts with the tooth-brush under proper instruction and direction.

That possibility has been recognized as long and as far back as the records of dentistry go. Our own Dr. Cushing was the first man who ever impressed that fact upon me, and since then, I am sure, I have enabled many patients to arrest decay by proper observance of hygienic measures. Dr. Cushing used to say that if it was possible to keep the mouth absolutely clean there could be no decay.

Dr. Truman W. Brophy:

While Dr. Kester has been separated from us for a little while, it is evident he has been thinking a good deal about professional advancement. Had he not done so, this paper probably would not have been presented.

As to the work of Dr. Michaels, in Paris, Dr. Hinkins and I visited him in his laboratory, but as to whether his method comes up to the highest ideal of the careful investigator, or his chemicals were tested and the material with which he tested the chemicals was also tested to determine if the numerous agents employed were up to the highest ideal of the modern scientific investigator, I do not know. But this I do know, that much credit is due to Dr. Michaels for his untiring efforts in attempting to solve through the examination of the saliva some of the causes of disease. I think Dr. Michaels has set the scientific world thinking along these lines, and even though his own results have not been entirely satisfactory to the most exacting scientists, he has put them to thinking, and by their aid and perhaps advanced methods of investigations much good will come out of what he is doing. I am not prepared to say that he has not already accomplished considerable in the way of diagnosis by examining the saliva. I visited him while in Paris, and at the time I was very much fatigued in attending meetings, visiting places, etc., and he said to me, "Let me examine your saliva." After examining it, he said nothing except that I had a tendency toward rheumatism or gout. I told him I did not think I was gouty. But he said I had some symptoms of gout. If a man is able, by means of examinations of the secretions, to determine the nature of the trouble a patient is subject to, he will have accomplished great things.

Examination of the blood is occupying a great deal of the attention of scientific men to-day, who are attempting to determine by these examinations the character of the malady from which the patient is suffering.

Dr. Wassall has made a statement that I would have been very apt to make if he had not done so, and since he has made it, I agree with him entirely. There is no one who can convince me from the experiments that have been made up to the present time, with which I am familiar, that all teeth have the same degree of density, resisting power or force, or that they are alike, and that one tooth is just as liable to be attacked by caries as another; that the quantity of organic matter in one tooth is the same as in the other teeth. I do not believe teeth have the same quality in all cases. Let us take, for instance, the bones of animals. It is an established fact, with which I think nobody will disagree, that the bone of a thoroughbred horse is not the same as the bone of a big,heavy draft horse. There is as much difference in the quality of the bone in a thoroughbred and a draft horse as there is between ivory and bone. The bone of a thoroughbred horse is closely knitted; it is dense; it will take on a high polish; it is not porous; there is less cancellated tissue in it; while the bone of a draft horse has more cancellated tissue in its make-up. He does not depend so much upon bone as upon the muscles that cover it. I believe the same condition pertains to the teeth of individuals. In one mouth a tooth is not as good as the teeth in another mouth. For instance, I recall a patient who lost a right or left first upper molar, and as a consequence the bicuspid was prematurely erupted; it came in three years too soon, and that tooth is not as good as the other teeth. It is soft, and it has been necessary to fill it a number of times. It is with difficulty that the integrity of that tooth can be preserved, because it is soft and friable. I do not think anyone can convince me that this tooth is as good as the other teeth in that same mouth. It does not, in my opinion, admit of logical argument, yet we hear dentists say that teeth are all alike. I do not know on what they base their judgment. If that tooth were removed and put under pressure along with the teeth on the opposite side, I am sure it would go to pieces, while the others would resist the force. I know that is so. It is not guesswork.

DR. L. L. DAVIS:

I have listened to the paper of Dr. Kester with a good deal of interest, and yet there is one thing in which I have taken no stock since its incipiency, namely, the bio-chemic theory. It starts out with a wrong foundation.

Drs. Wassall and Brophy spoke of the varying density of teeth in the same mouth, yet neither one gave a correct parallel of cases as regards the constituents of tooth substance. Dr. Brophy made a comparison of the bones of a thoroughbred horse and those of a draft horse. If both animals are in a healthy condition the bone is good. We may compare the bone in teeth with the bones of rickety children. A rickety child has an excess of tissue of one character, so that it is not able to bear its weight by the muscles and the rest of its body upon the legs, whose joints are perhaps out of condition, and whose bony system is not up to par. The same thing prevails in regard to the teeth. We have seen teeth with immense interdental spaces directly below the enamel, where the dentine was not firm, and just as soon as you go through a small cavity in the tooth you find the tooth breaks down readily, and you have a tooth practically without any substance to it. From that one standpoint, it is absolutely ridiculous to say that tooth tissue is absolutely the same, and that decay is the result of the secretions. There is a good deal to be learned and to be done in the future of dentistry, as regards preventive measures and by analyses of saliva, thus getting at the particular agents or causes which tend to multiply the bacilli of caries, or which tend to produce the different forms of cocci which may result in disease, and I have not the slightest doubt but that this is a step in the right direction, and that what Dr. Kester has said is very largely true. I have always taken a strong stand against one statement, that all teeth are alike; that the component parts of all teeth are the same; that the organic and animal matter are the same in poor teeth as in strong ones.

We are indebted to Dr. Kester for presenting such an admirable paper.

Dr. E. J. Perry:

Decay of the teeth in some mouths takes place more rapidly than in others, because the teeth themselves do not have the power of resistance. I regard that as a very essential factor in the causation of dental caries. Teeth decay because of particles of food left between them to ferment, and yet we see mouths practically free from decay, with teeth perfectly sound, solid, and good, yet the health of the person possessing them may not be any better than the health of patients whose teeth we are scarcely able to save. There cannot be a doubt but that the causes of caries are external to the teeth; that it is caused by the fermentation of food and other extraneous substances caught in the interdental spaces, in the sulci, and various other places about the teeth, where they may lodge, ferment, and generate acids. From the fact that some teeth resist decay successfully and others do not, it is clear to my mind that there is much in the density or capability of various teeth to resist decay. I asked Dr. Black once if some teeth were soft and some hard, and he replied, "No, they are all alike." I do not believe this.

I began to practice dentistry when there was no such thing as a dental engine or rubber dam, and nearly all the changes that have taken place since then have been noted in this paper. Dr. Kester has put in motion a set of thoughts by noting these changes.

Dr. E. A. Royce:

I was delighted with Dr. Kester's paper, and I think the sentiment of the profession is that a very large proportion of the advancement that is to come must be in a scientific line, that is, the treatment of diseases of the mouth in a scientific manner.

There is only one point in the paper to which I desire to call attention, and that is, that the conservative part, so far as caries is concerned, has reached its limit, and that anything new in the operative department of dentistry need not be looked for. Watch the operative treatment in the next ten years, and if you do not see as great improvements as you have seen in the last ten years in the profession, I will be very much mistaken. A very small step in advance in the operative department of dentistry to-day is a great step, because the past is so great. We have gone so far, but I ask you to watch the operative department of dentistry.

The scientific part will have to work rapidly to make more rapid strides than the operative department. The greatest stride that will be made in the operative department will be in bringing up the laggards. The leaders in operative dentistry may be near the top, but where are the laggards? Where is the rear guard? It is where the leaders were ten, fifteen, or twenty years ago. That rear guard will be brought up in a degree, and you will be surprised at the changes in the quality of work in the next ten years. I appreciate as fully as anyone the lack of our scientific treatment of diseases of the mouth, and I look for great strides in that direction in the future. But I am sure the other department will not lag behind.

Dr. J. H. Woolley:

The essayist started out with the thought of evolution as applied to dentistry. I have not paid particular attention to the chemistry of the mouth. Dr. Hinkins has told us that he thinks that problem is hard to solve, and that it is questionable whether it ever will be solved. It seems to me, we will have to direct our attention more in the line of treatment of diseases of the teeth and particularly toward the prevention of decay.

Some time ago Dr. Royce gave us an excellent paper on antiseptic fillings, and advocated making more perfect fillings. I have for a number of years been trying to experiment with reference to decay of the teeth, not in the line of the action of the saliva, but rather in the direction of the use of antiseptic fillings, how to prepare a cavity after decay is removed, and put it in a condition preparatory to the insertion of a permanent filling. I have noticed for a great many years that in the treatment of children's teeth gutta percha has served very well as a filling material for the temporary teeth. It acted well upon the tooth structure. I have used it in many cases as a preparatory filling, for six or seven months, or even longer, and after the removal of these temporary fillings I have found the cavity materially hardened, so that when I have placed permanent fillings in those teeth they have subserved the best interests of the tooth structure.

Dr. C. S. Case:

There is one point that has not been stated definitely, namely, that the advanced dentists hold to the idea of a relative difference between the constituents of the different teeth. It has not been stated exactly why this should be, and I trust Dr. Kester will explain that point when he closes the discussion.

Dr. J. G. Reid:

I am not prepared at the present time to believe that the statements that have been made in this discussion are based upon individual approval or upon analyses of teeth. It is simply an opinion, and one that has not been founded on actual investigation. It is easy for us to criticize experimenters and the men who devote considerable study and a long time in determining certain physical characteristics of teeth. I do not wish to combat the idea that there is a difference in the physical characteristics of teeth, but I am prepared to assume that the elements are there just the same in every tooth in the same proportion. I assume this because it has been demonstrated experimentally. Their observations may have been faulty, but so far as they have gone, they have proved conclusively, by actual demonstration and experiments, that those conditions that you and I see are not true, and I do not believe it is right for me to say that they are true, because I have not established or corroborated their conclusions by my own experience and demonstration.

Environment has much to do with the conditions, as has been brought out in this paper. There are certain things taking place constantly in our physical frames, so that the human body varies every hour in the day. While the paper has not been exhaustive, and the author has only presented a theory, still I am led to believe that better methods are being adopted to-day in determining diseases of the teeth than perhaps at any time in the history of dentistry, because we are beginning to know more about them. We are beginning to find out other channels of investigation.

I have been very much impressed with the proposition that Dr. Miller has started out to demonstrate, and it occurs to me he is starting out pretty early on good lines. I believe that he is going further than anybody else. We are repeatedly discovering things with which to combat certain diseases. We know that there are toxic conditions, and we know that these conditions can be combated. We now go so far as to assume that certain electrical conditions will cure certain diseases which we cannot cure by any other method. After a while, I predict, we will successfully combat tuberculosis. We have combated diphtheria by the use of antitoxin; we have combated small-pox and many other diseases, and I believe some day we will find a method with which to combat caries of the teeth. While Dr. Kester is all right as far as he has gone, he did not go far enough into the subject, because he has not studied it sufficiently. Neither have I. He has brought out the idea that there is something we are not acquainted with, and that something lies in the conditions suggested in Dr. Miller's article. If you have not read this article, it will repay any of you to study it. He has written in such an elementary manner that anybody can understand him from the first, and to me it is a most fascinating question.

DR. W. V.-B. AMES:

I only have a word or two to say with reference to a point that was impressed upon me to-night, as it was at the last meeting of the Chicago Dental Society. At that meeting certain matters came up, and I asked the essayist a question which was not answered to my satisfaction, in regard to the influence of metallic silver or some other metal upon the growth of micro-organisms. The answer was to this effect, that by no chemical analysis could it be discovered that there was any action of silver wire or silver tubes embedded in the tissues which exerted a radical influence on the growth of micro-organisms. This only demonstrates to me that the limitations of the measuring of influences and conditions are not confined to chemical analyses, and to the possibilities of analytical balance. After listening to this paper, it is plain to me that there is very much upon which we must merely conjecture and arrive at conclusions by analogy rather than by any real, definite chemical results by way of analysis, measurements and weights.

DR. ELLIOTT R. CARPENTER:

I have very little to say on this subject, because it is one I have not had the opportunity to investigate, particularly chemical analyses of the saliva. Of course, we all know that there are a great many influences or changes in the conditions of the human body, in the mouth, and in the stomach, which go to produce changes in the saliva, and while the saliva may be harmless, so far as its ability to produce or abate the production of caries, I believe there are germs which exert quite an influence in producing caries. Especially is this true if the mouth has been left in an abnormal condition, allowing lodgment of food stuffs between the interdental spaces, etc. Even if the mouth is kept in a thoroughly prophylactic condition, there are times when there is a reflex from the stomach, such as will superinduce an ulcerative stomatitis and conditions of that kind, which must have an effect of a destructive nature in them. As yet, I have not been able to see wherein we, as dentists, are going to get much good from analyses of the saliva. To the physician these analyses of the saliva may be of infinite benefit.

So far as the separate proportions of the constituents of the teeth being always present are concerned, I do not believe it. I believe each tooth is as a separate organism, and under some special condition, say an irritation, of it, will show signs of going to pieces. Of course, this is purely a theory of mine. Practically, I cannot prove it. I wish I could. I have had cases within the last two years that have made me think along these lines. I have had, as presumably you all have had, a number of trained nurses as patients. These nurses are clean; they are taught cleanliness in training-schools and in their work, and I believe there is no class of people who take better care of their bodies than trained nurses. I have had several of them come under my observation and care in the last three years, during which I have observed the character of their teeth. Apparently the teeth were sound and strong and kept in good condition; they used floss and the tooth-brush frequently after every meal. There was no lodgment of food left in any corner of the mouth. There would be times when there would be no breaking-down of tissue at all; then there would be one or two weak points in the teeth discovered. I do not believe the breaking-down of the teeth in these nurses was due to external causes, but to internal causes, the result of a special irritation which comes from the blood circulation, and from a lack of healthy conditions there.

Dr. J. E. Hinkins:

I intended to mention one or two points in my previous remarks, but I will do so now. While I have not analyzed teeth to see if they were all of the same density, yet I am satisfied in my own mind that teeth vary in density the same as bone in cases of rickets, scrofula, etc. It would be an exceedingly difficult thing to analyze them and obtain the same amount of water which is in the normal tooth, after it is once extracted, unless analyzed immediately.

Within the last year and a half the manufacturers of cereal products and the biscuit manufacturers are putting forth the best chemical energy they can procure to ascertain the action between the starches and the digestive apparatus. The American Cereal Company and the National Biscuit Company have had a number of chemists at work along certain lines, to ascertain, if possible, what action these starches, cereals, etc., may have on the digestive tract. They have been experimenting with glucose, together with the different ferments, as to their enzymatic action, and they have procured ptyaline, which is an enzyme of the mouth, to find out if it has any enzymatic action, or whether the action is similar to the fermentation we get in the mouth from particles of starch, glucose, or sugar that is left in there and acted upon by the micro-organisms or the digestive material of the micro-organisms. This is one of the leading chemical questions of the day, and a vast amount of research work is being carried on in regard to it. As to the results of these investigations we do not know, but we do know that many of the virulent forms of bacteria, when deprived of their enzymatic action, are absolutely harmless. If kept from the starches they are harmless, but mixed with the starches, the glucose or sugar is formed by the action of the enzymes, also an electro-chemical action, which is increased by the aid of electricity to the same ferment. It makes a complex study, for the reason that there is very little literature on the subject. About all the literature we could find in medicine or dentistry regarding analyses of saliva can be found in the paper I read before the Odontological Society of New York. In that paper I covered the medical and dental literature as completely as possible.

Last week a chemist of the National Biscuit Company, knowing that Dr. Acree and myself had done considerable experimental work, invited me to dine with him. We discussed this question fully at the table. While he did not wish to go on record as making any definite statement, he assured me that there was considerable research work going on in this direction.

G. W. Carmick & Co., of New York, have recently put on the market a preparation of ptyalin to aid in digestion. It is made from the ptyalin of the ox. They are advertising it extensively. Chemists and pathologists know that this is an enzyme which has the power of producing fermentation on either animal or vegetable life, but what its chemical composition is they have never been able to determine or to analyze. They have never been able to see it with the microscope, but they know it is there.

Dr. Kester (closing the discussion):

We have all noticed cases of immunity from decay. This immunity from decay is probably brought about through some inhibitory influence contained in the saliva itself. The saliva contains certain elements, which probably do for the saliva just what the white corpuscle does for the blood. They render immunity against the formation of the destructive elements in the mouth. Dr. Michaels is looking for the causes of decay; looking for symptoms of disease; looking for the inhibitory properties of saliva, purely from the standpoint of the chemist. For instance, he found in his experiments that when sulpho-cyanogen was present in the saliva the teeth were rendered immune from decay. Miller has shown that the application of sulpho-cyanogen to his cultures has no inhibitory influence on decay.

With reference to the matter of hardness or composition of teeth, I do not think it is claimed by those who have carefully investigated the matter that there are no exceptions. It is not claimed that the teeth of rachitic children are of the same composition as the teeth of others. As I understand it, rachitic children have poorly nourished bones; they are poorly developed, and all of the tissues of the body are illy nourished, but I think the statement will go unchallenged that all normal teeth are of the same composition. It has been determined by analysis that there is no difference between normal teeth as to the relative composition. If there is any difference, it is so slight that investigators have failed to notice it.

With all due respect to Dr. Brophy, in regard to his statement that the bones of a thoroughbred horse contain more lime salts to a given weight than those of a draft horse, I do not believe that is true. While the bones of one animal may not be quite so dense, so far as their physical appearances are concerned, chemical analysis will show that the relative proportions of animal and organic matter are the same in the thoroughbred as in the draft horse.

The thought I had in mind in bringing this matter before the Society was this, that preventive medicine, as applied to dentistry, was just as sure to be developed as it is being done in medicine. There is no question at all but that we belong to the medical profession, whether we admit it or not. Our professional work lies along the same lines, and we cannot get away from it. There is no question but that preventive medicine is agitating the medical profession, and I can see many reasons why preventive dentistry will be the coming thought of the dental profession. If the rising generation of this country could be placed in the hands of such good dentists as are here assembled, the mechanical dentist would have to retire from business. Let us take the ordinary normal mouth. If any dentist here could have the care of the mouth of a child from early childhood up to the time of maturity, there would not be any occasion to put on a gold crown. Any of you could protect the teeth of these young patients if they came under your care early. Of course, we would be expected to repair any loss by accident or replace teeth that drop out on account of extreme age. But I believe that if the young people of this country could be brought under the care of good dentists early, the mechanical dentist would have little to do.

I am a firm believer in the thought I expressed in my paper, that is, that the beginning contains within it the end, and all that pertains thereto, and that having gotten hold of one strand of the truth in this matter, investigation will go on until the whole truth shall be revealed to us, and although we may not live to see it, I believe the time will come when the dentist of the future will be able to so practice dentistry that filling teeth will become a lost art.

INTERNATIONAL DENTAL FEDERATION, MADRID, SPAIN, APRIL, 1903.

REPORT OF DR. SAUVEZ, SECRETARY-GENERAL OF THE INTERNATIONAL DENTAL FEDERATION, TO THE EXECUTIVE COUNCIL ON THE SUBJECT OF THE ST. LOUIS CONGRESS.

My Dear Colleagues:

Last year at Stockholm, August 15, the Executive Council of the International Dental Federation received an invitation presented by Messrs. Truman W. Brophy, William C. Barrett and Eugene Smith, regularly nominated by the President of the National Dental Association of the United States, asking it (the Executive Council) to designate St. Louis, Missouri, as the place of meeting, and the month of August, 1904, as the time of an International Dental Congress, which will be called the Fourth International Dental Congress. These members also gave us special invitations from the Governor of the State of Missouri, the Mayor of the City of St. Louis, the National Association of Dental Examiners, the Dental Association of the State of Missouri and Eastern Kansas, the Odontological Society of St. Louis, the Louisiana Purchase Exposition Company, the Society of Dental Science of St. Louis, the Odontographs of Western Missouri and Eastern Kansas, and the Dental Society of St. Louis. These invitations were accepted after four sessions of deliberation by a vote of six to two.

The Executive Council named at the conference of August 18, 1902, at the session at Stockholm, a committee of nine members for the purpose of assisting in the organization of the Fourth International Dental Congress to be held in the City of St. Louis, Mo., in 1904. Thus it had been decided by the Executive Council at Stockholm, according to the invitations which had reached it (the Council) at that time. (See this decision annexed.)

Now, some weeks before the session of the International Dental Federation, at the meeting of the National Dental Association, United States of America, held at Niagara Falls, N. Y., at its last meeting in July, 1902, this association had already named a committee of 15 members to organize the International Congress of St. Louis, in case the council should accept the invitation and should consent that the St. Louis Congress be the Fourth International Congress. We had no knowledge of the nomination of the committee of 15 made by anticipation, and none of the United States delegates to Stockholm announced to us the existence of this committee, of whose existence they were not aware.

The result of this situation is a series of complications, and it is important that you should know them, and we are going to make an effort to explain them to you.

Some days after our separation at Stockholm, in the month of September, 1902, Messrs. Harlan and Brophy asked for instructions. M. Godon, alone present at Paris, replied in his own name to Dr. Brophy by saying to him that the powers of the Executive Council of the Federation were fixed by resolutions 13 and 14 of the general assembly of August 15, 1900, which had commissioned him to assure the organization of the next International Dental Congress, and consequently the committee of the nine members named by us at Stockholm, to represent the Executive Council on this subject, should, in his opinion, in the absence of special decisions of the Executive Council on this point, seek to have an understanding with the National Committee in America. In this letter M. Godon requested Dr. Brophy to take the initiative of the direction of the said committee till the committee on organization should be regularly constituted.

October 15, 1902, Dr. Brophy sent us a cablegram asking for immediate official instructions on the powers and duties of the committee of nine.

By letter, dated October 8, we sent Dr. Brophy the exact text of the substance of the proces-verbal containing the decisions come to by the Executive Council at the Stockholm conference, as well as instructions on the powers of this committee.

Under the same date we wrote an official letter to the President of the National Dental Association requesting him to communicate with Dr. Brophy relative to a copy of these decisions which had been sent him some time previously by M. Aguilar, charged in connection with this with a mission to America. We addressed a statement of these facts to Messrs. Frank and Aguilar, members of the bureau, in their capacity of Vice-Presidents, to ask them for their advice.

In the continuation of the two sessions of the bureau of the Executive Council of the F. D. I. held October 10 and 14, and after the report given by M. Aguilar of his mission to America, we addressed to the committee of nine named at Stockholm a long letter under date of October 15, in which we stated precisely their powers and their duties, as you will see from the extract hereto adjoining.

Paris, Oct. 8 and 15, 1902.

SIR AND HONORED FELLOW MEMBERS:

In conformity with the resolutions No. 13 and 14, voted at the general assembly of the Third International Dental Congress, held at Paris in 1900, the Executive Council of the F. D. I. has been directed to organize and prepare the next congress.

The invitations received at Stockholm have been accepted, as we have indicated above. By this acceptance the Executive Council has given proof of its confidence in the divers groups and personalities who have invited it, and it thinks that the latter will interest themselves in the organization both at home and abroad, each one as it shall concern him.

The International Dental Federation should take no part other than to watch over the international interests which it represents, and the committee to which you belong should see that foreign countries shall have the places to which they are entitled in the Fourth International Dental Congress. Consequently, it appears to us as a line of conduct indicated that you should co-operate with your colleagues of the committee in order to form your bureau in the appointment of a President, a Vice-President and a Secretary.

The committee so appointed will be in harmony with the several groups who have sent the invitations in order to co-operate in a proper organization of the congress and will place themselves at the disposition of the organizers. According to circumstances the said committee will send a report to the President of the Executive Council of the F. D. I., who will send new instructions if the question shall appear to him to be within his jurisdiction. And if on the contrary, will refer it to the Executive Council at the next meeting of the federation at the time of the session at Madrid, in April, 1903.

In case any member of the committee should fail to act, resign or die, the committee is authorized to replace him.

We beg you, sir and honored fellow-member, to acknowledge the receipt of this letter and the documents herewith, and also to let us know if, as we hope, you will accept the mission intrusted to you.

Relying on your valuable co-operation, we beg you to accept, sir and honored fellow-member, the assurance of our brotherly esteem.

(Signed) Ch. Godon,
President.

(Signed) E. Sauvez,
Secretary-General.

This extract has formed our line of conduct from this time and has been communicated to the several personalities with whom we have been corresponding on this subject (Messrs. Brophy, Burkhart, Harlan, Kirk).

October 25 the committee of nine of the F. D. I. met at Cincinnati, Ohio, and named its bureau with T. W. Brophy as President and J. D. Patterson as Secretary. The National Committee (of 15 members) elected at Niagara Falls, also met at Cincinnati on October 25, and was invited to unite with the federation committee.

It first organized, then adjourned and came in a body to the meeting of the federation committee. At this meeting a discussion arose on the subject of the powers and duties of the committee of nine, such as we had defined them by our previous letters, and the members of the National Committee contested the sense of our instructions, and even our right to give them.

Messrs. Kirk and Patterson, in their respective capacities of secretaries of the two committees, were instructed to inquire into this subject through us, as you will see by the documents hereto attached.

The president of the committee of the National Dental Association, Dr. H. J. Burkhart, as well as Messrs. Harlan, Brophy and Kirk, wrote to us in the early part of November to inform us of the situation and asking our decision on the subject of the conflict.

On November 9 we receive the resignation of Dr. Eugene Smith, of the committee of nine. This member has since been replaced by Dr. Walker, of New York. Dr. Harlan, who by his previous letters kept us acquainted with the current of affairs concerning the conflict, informed us by despatch, dated Nov. 17, that he was of the opinion that the decisions should be deferred to the Madrid session.

The situation was looked into Nov. 18 at a reunion of the bureau that took place at Paris, and we wrote to the different persons with whom we had been in communication on this subject and requested them to make mutual concessions in order to bring about a reconciliation between the two committees in the general interest of the congress.

In a correspondence of Nov. 22, Dr. Brophy demanded of us to state precisely that he had simply presented to the Executive

Council at Stockholm the invitations of the several dental societies of the United States on the subject of the St. Louis Congress, in the name of his colleagues, but that he had in no manner whatsoever given to understand that he was president of the committee charged to bring to Europe the said invitations.

We hastened to give him by letter under date of December 11 an official authentication of this fact which is consonant with the truth, as you know it to be from another reason.

We have now outlined to you, my dear colleagues, the different phases of the incidents that have arisen in the United States on the subject of the interpretation of the decision we came to in common at Stockholm in nominating a committee of nine members, destined to co-operate in the organization of the St. Louis Congress and to represent the Executive Council.

Since that time we have received a joint communication, under date of December 5, from Dr. Kirk, secretary of the committee of 15, and Dr. Patterson, secretary of the committee of nine.

We add hereto a copy of this document as well as the reply that we believed it to be our duty to give in order to stop a conflict which threatens to be productive of grave prejudices to the St. Louis Congress.

The national committee, notwithstanding what had been agreed to with the committee of nine, commenced to organize at a meeting which was held in Washington, Dec. 13, without waiting for the solution of the conflict, and the proposition to harmonize the two committees has not been approved.

A STATEMENT.

December 5, 1902.

Respectfully directed to the Executive Council of the Federation Dentaire Internationale.

DR. CH. GODON, President.
DR. F. SAUVEZ, Secretary.

At the meeting of the National Dental Association, U. S. A., held at Niagara Falls, New York, in July last, an invitation was extended to the Federation Dentaire Internationale to designate St. Louis, Mo., U. S. A., as the place, and the month of August, 1904, as the time, for the holding of the Fourth International Dental Congress. At the same meeting, a Committee of fifteen was named to organize the Congress in the event of an acceptance of this invitation by the International Dental Federation. This invitation was presented to the Executive Council of the Federation of Stockholm, and was accepted.

At the same meeting of the Federation, a committee of nine was appointed to represent the Executive Council of the Federation and to assist in the organization of the Fourth International Dental Congress. These committees met at Cincinnati, Ohio, U. S. A., but were unable to harmonize the different letters of instructions sent out by the Executive Council of the Federation, which appear at times somewhat confusing and contradictory. They therefore appeal to the Executive Council to authoritatively and explicitly state which of the two committees is in charge of the organization of the Congress.

We ask an explicit expression on this subject. We do not seek now for advice, but simply a decision as to which of the two committees shall be supreme and which subordinate.

This question answered, we can readily arrange the rest.

The undersigned were appointed by the two committees to obtain a positive and indisputable answer to this one question.

For the Federation Committee—J. D. Patterson, Secretary.

For the National Committee—Edward C. Kirk, Secretary.

REPLY TO DRS. PATTERSON AND KIRK, SECRETARIES FOR THE COMMITTEE OF THE INTERNATIONAL DENTAL FEDERATION AND THE NATIONAL DENTAL ASSOCIATION.

Dec. 26, 1902.

DEAR FELLOW-MEMBERS:

In reply to your letter of Dec. 5, 1902, and to the declaration which it contained, we held, at Paris on Saturday, Dec. 20, a meeting of the bureau of the Executive Council of the International Dental Federation, which Dr. Godon, President of the Executive Council, Dr. Sauvez, Secretary-General, and Dr. Aguilar, of Madrid, Vice-President and Treasurer, attended.

After due cognizance of your letter, of your declaration, and of the several documents which have been sent to us, and after mature and deliberate reflection concerning the questions that have been submitted to us, we have drawn up the declaration hereto adjoined, which, in our opinion, is the only decision we believe ourselves authorized to come to on this subject.

We hope you will find therein the solution of the dispute which exists between the two committees, and that it will permit of the restoration of harmony between all those who desire to work in the interest of the Fourth International Dental Congress at St. Louis.

Have the kindness to accept, dear fellow-members, the assurance of our best wishes.

(Signed) Dr. Godon,
President of the Executive Council of the F. D. I.
(Signed) Dr. Sauvez,
Secretary-General.

DECLARATION.

It results from the official declaration under date of December 5, 1902, of Drs. Patterson and Kirk, in the name of their respective committees, that there actually exist in the United States two committees, each of which has been directed to organize the Fourth International Dental Congress at St. Louis, in 1904 (the committee of nine members named at Stockholm by the F. D. I. and the committee of fifteen members named at Niagara Falls by the N. D. A.), and that the question placed before us to decide is, which of the two committees should have this mission and which of the two should be subordinate to the other?

1st. According to the decrees 13 and 14 of the International Dental Congress at Paris in 1900, the International Dental Federation is bound to organize the Fourth International Dental Congress.

Consequently, according to the decisions come to by the Paris Congress in 1900, and by the Executive Council of the F. D. I., the part to be taken by the committee of nine members is to organize, or, at least to assist in the organization of the Fourth International Dental Congress at St. Louis.

2nd. After the decision taken at the meeting of the National Dental Association, at Niagara Falls, a decision of which unfortunately we had no knowledge at Stockholm, the national committee of fifteen members named in anticipation of the acceptance of the invitation should have been governed by rule to organize the fourth congress.

The International Dental Federation, faithful to its principles and to its former line of conduct, cannot nor does it wish to interfere in questions of a national professional character.

This inconsistency of authority must appear as clearly to all those who, by a right of any kind, are interested in this question.

Can we, between two sessions of the F. D. I., with the powers that have been conferred upon us, settle this dispute and decide, as you demand, which one of the two committees is the supreme and which subordinate?

The officers of the Bureau of the Executive Council of the F. D. I. do not consider themselves sufficiently qualified to reply to this question without adopting a line of conduct contrary to the spirit of the Federation. In reality we do not believe that supremacy can actually be given the committee of Federation, for it appears that it is not the desire of the National Dental Association and the F. D. I. to oppose each other in sentiments and decisions of national organizations.

Nor can we either grant this supremacy to the committee of fifteen, for it would be to abandon the mission confided to us by the Third International Dental Congress at Paris in 1900 to insure the execution of votes 13 and 14, and also to disclaim the representatives of the F. D. I. whom we nominated at Stockholm with the mandate to aid in the organization of the future congress.

Regularly, all those who had sent the invitations should have been brought together again on the initiative of the committee of nine of the F. D. I., after the session of Stockholm, in order to constitute the National Committee of organization of the congress—a committee in which the several entities who invited should have been represented.

Now, since that has not been done and that it seems difficult that this regular proceeding could be taken and followed now, seeing the actual situation, we do not believe ourselves authorized to give you the clear and precise reply that you persist in having, that is to say, to choose between the two committees without laying the full particulars before the Executive Council and consulting it.

Consequently we are compelled to postpone an answer to your questions till the next session of the F. D. I., which will be held at Madrid in April, 1903. A session to which the different interested groups will be invited to send delegates with reports of their exact missions.

In order to avoid this delay of four months, of which we estimate the inconvenience, a single proceeding will yet be possible, and we recommend it as a means of reconciliation; it consists in a fusion of the committee of fifteen and that of nine into a single committee and to constitute a new Bureau (President, Vice-Presidents, Secretaries, etc.). The new committee thus constituted will unite in this way the respective powers of the two antagonistic committees.

Done at Paris, Dec. 20, 1902.

(Signed) DR. GODON,
President of the Executive Council of the International Dental Federation.

(Signed) DR. SAUVEZ,
Secretary-General.

(Signed) DR. AGUILAR,
Vice-President and Treasurer.

Since that time the situation has not changed. The two committees, the International Committee of nine and the American Committee of fifteen are always in dispute over prerogatives, and it is incumbent on us to stop the contentions, in the fullness of our conscience and the powers that have been conferred on us by the General Assembly of August 15, 1900, at the Third International Dental Congress of Paris.

At the moment of departure for Madrid, your President and Secretary-General received from Messrs. Howard Rogers, Director of Congresses and David Francis, Director of the Exposition, the following document, of which you should take cognizance.

Sir:—The Universal Exposition at St. Louis, 1904, has the honor to submit the following statement for the consideration of the Federation Dentaire Internationale.

The Universal Exposition at St. Louis has decided to hold a series of International Congresses in connection with the Exposition in which shall be demonstrated the progress and present status of each division of science and of art. It desires that the great science of Dental Surgery shall have a thoroughly representative international attendance in order that this profession may occupy its rightful position in the series before mentioned.

The Exposition authorities are informed that at a meeting of the International Dental Federation, held in Stockholm, Sweden, in August, 1902, an invitation was received from the National Dental Association of the United States of America; from the President of St. Louis Exposition and from seven other organizations, asking that the International Dental Federation designate the city of St. Louis as the place of holding the Fourth International Dental Congress in the month of August, 1904.

The Exposition is further informed that the International Dental Federation appointed at that time a committee to assist in the organization and promotion of the Dental Congress.

From the instructions given to the members of the said committee of Federation by Mr. Godon (said instructions being expressed in the following language):

"Par cette acceptation, le Conseil executif a montré qu'il accordait sa confiance aux divers groupements et personalités qui l'avaient invité et il pense que ceux-ci s'occuperont de l'organisation intérieure ou nationale, chacun en ce qui le concerne. La Fédération Dentaire Internationale ne doit avoir comme róle que de veiller aux intérêts internationaux qu'elle représente et le Comité dont vous faites partie doit veiller á ce que les pays étrangers trouvent la place qui leur est du dans le 4ème Congrès Dentaire Internationale."* We gather that it is the wish and the desire of the International Dental Federation that all matters connected with the internal organization of the Congress, as a component part of the Universal Exposition, should be vested in the committee nominated for this purpose by the Exposition upon the recommendation of the National Dental Association of the United States, it being the policy of the Exposition in promoting the Congresses to work in conjunction with the national organizations wherever existing, as in Medicine, Jurisprudence, Engineering, etc., and in accordance also with the precedents established at former Expositions. We believe that there are distinct fields of work in which the official committee of the International Dental Federation may collaborate to the high success of the Fourth International Dental Congress and the great good of the dental profession.

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*Translation—By this acceptance the Executive Council has shown that it has bestowed its confidence on the different societies and the personnel (those charged with the duty) who had invited it, and it believes that the latter will attend to the organization inwardly or nationally, each one to that part which concerns him. The International Dental Federation should have as a part only to watch over the international interests which it represents, and the committee of which you are a part should watch that foreign countries find the place that is due them in the Fourth International Dental Congress.

The Exposition, wishing to concede to the International Dental Federation every right and courtesy in the matter, finds itself somewhat in doubt in interpreting the clause "La Federation Dentaire Internationale ne doit avoir comme rôle que de veiller aux intérêts internationaux qu'elle représente et le Comité dont vous faites partie doit veiller á ce que les pays étrangers trouvent la place qui leur est du dans le 4ème Congrès Dentaire Internationale,"* contained in the letter of instructions of President Godon, and respectively requests the International Dental Federation in convention assembled at Madrid to state more explicitly the duties embraced under this phraseology.

It has seemed to the Exposition authorities and to the Exposition Committee, after a careful consideration of the letter of instructions above mentioned, and a thorough study of the published proceedings of the International Dental Federation at the meetings held in Paris, London and Cambridge, that an eminently fair division of the labor included under this phrase would give to the Exposition Committee, above mentioned, the duties of acting the part of hosts to the members of the dental profession of the world and of providing the ways and means of holding the Congress.

At the same time, to the International Dental Federation should fall the responsibility of securing adequate representation from the various dental organizations included in their membership outside of the United States of America, the dissemination of information concerning the work of the Congress, an equal representation on the committee which shall prepare the scientific program for the Congress, and such other committees as may be found to be necessary in order to fully represent the interests of the members of the dental profession in all countries.

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*TRANSLATION—The International Dental Federation should have as a part only to watch over the international interests which it represents, and the committee of which you are a part should watch that foreign countries find the place that is due to them in the Fourth International Dental Congress.

In submitting this brief for your consideration, the Universal Exposition, St. Louis, 1904, beg to express their high appreciation of the courtesy of the International Dental Federation in designating St. Louis as the place and the Universal Exposition of 1904 as the opportunity for holding the Fourth International Dental Congress, and beg further to assure you of their high respect for the purpose and aims of the Federation and of their great willingness to assist in their development.

We have the honor to remain, your obedient servants,

HOWARD J. ROGERS,
Director of Congresses.
DAVID R. FRANCIS,
President Universal Exposition, 1904.

We have also received from Dr. Brophy, President of the committee of nine, named by the F. D. I., the following document which we pray you to take cognizance of.

Dr. Charles Godon, President of the International Dental Federation.

Dear Doctor:—We are in receipt of a communication addressed to Drs. Patterson and Kirk in which you state that the question left to you to decide as to whether the committee appointed at Stockholm, which represents the International Dental Federation or the Committee of the National Dental Association has authority to organize the Fourth International Dental Congress, which is in authority and which is subordinate, has received your careful consideration and you state that, "We have reached the conclusion that reflects the manner of looking at it, and the only decision which we believe we are authorized to take upon the question." Your decision is in accord with all your previous decisions, and is as follows:

"According to resolutions 13 and 14 of the International Dental Congress of Paris of 1900, the International Dental Federation has the duty of organizing the Fourth International Dental Congress, hence, the committee of nine which was named by the Executive Committee of the I. D. F. at Stockholm in August, 1902, has this mission."

The above quotation from your communication is a clear and precise answer to the questions put to you by Drs. Patterson and Kirk. Following this, however, you state: "We do not believe ourselves authorized to give you the response clear and precise which you desire—that is, to choose between the two committees without giving cognizance of the present circumstances to the entire executive committee and consulting it. In accordance, we feel obliged to refer your request to the approaching session of the International Dental Federation, which will be held in Madrid, 1903;" in lieu of which you recommend that the two committees unite.

Shortly after we returned from Europe, the committee of the National Dental Association called a meeting at Cincinnati to organize the Fourth International Dental Congress. The committee of nine met at the same time and place. Dr. Patterson being a member of both committees, requested the committee of fifteen to come to the meeting of the committee of nine. The committee of fifteen refused to do so until after it had organized, after which the members came to our meeting and listened to the reading of the official instructions of October 8th from Paris, those of the 16th not having been received at the time. The committee of the National Dental Association objected to your instructions to us on the ground that they were not clear nor consistent with the communication delivered to Dr. Noel, President of the National Dental Association, by Dr. Aguilar. After considerable debate, a committee composed of Drs. Patterson and Kirk was appointed to present a statement of the matter to you, which brought the communication to which we are now referring.

It was agreed at the joint meeting of the committees in Cincinnati that nothing would be done toward organizing the Congress by either committee until Drs. Patterson and Kirk received a reply from you to their questions, and it was further agreed that your decision would be accepted by both committees as final.

Notwithstanding this agreement, a meeting was called by the National Committee of fifteen, of which Dr. H. J. Burkhart is chairman, and Dr. Kirk is secretary, to meet in Washington on December 13, 1902. We protested against this breach of good faith on the part of the committee of fifteen. Our chairman was invited to go to the meeting in Washington but replied to Dr.

Burkhart that the committee could not meet unless it violated its agreement, and assured Dr. Burkhart that he would not go to Washington, as he intended to keep his promise. In response to our chairman's letter Dr. Burkhart replied, closing with the following paragraph: "Whatever action our committee takes at Washington, and whatever negotiations in the future are considered necessary, will be carried on with the Federation officials abroad."

After this letter had been received, you can see that we could not join with the National Committee, as Dr. Burkhart made further consultation impossible. If you, in your decision of December 20th, had stopped at the end of paragraph one we could have gone on and organized the Congress by requesting that one or more members be elected from each of the inviting bodies, viz.:

The Louisiana Purchase Exposition Company.

The National Association of Dental Faculties.

The National Dental Association of the United States of America.

The Governor of the State of Missouri.

The Mayor of the City of St. Louis.

The National Association of Dental Examiners.

The Dental Association of the States of Missouri and Eastern Kansas.

The Society of Dental Science of Saint Louis.

The Odontographs of Western Missouri and Eastern Kansas, thus forming a committee to organize the Congress.

The National Dental Association through its committee of fifteen, has arrogated to itself the sole duty of organizing the Congress, contrary to resolutions 13 and 14 adopted on the last day of the last session of the third Congress Dentaire Internationale.

Since our appointment, we have tried, in a dignified manner to represent the Executive Council and uphold the honor and dignity of the Fédération Dentaire Internationale. In order to secure harmony and to ensure the co-operation of all the dentists in America, we agreed with the Committee of the National Dental Association at Cincinnati to ask you to make a positive statement and make it so clear that it could not be misunderstood.

Our committee has taken no action, nor has it announced what course it intends to pursue. The officers of the Executive Council made a decision which the committee of the National Dental Association refused to accept, and which was not of itself entirely decisive. In making that decision, the officers of the Executive Council of the International Dental Federation said that, if their communication was not satisfactory, the matter must be left until a full meeting of the Council at the time of the meeting of the International Medical Congress in Madrid, in April of this year. There it now rests and the committee appointed by the Federation at Stockholm is ready cheerfully to concur in any decision there made. If the Federation or its council desires to abdicate and withdraw its authority over its own organization, its committee, while regretting that it has been placed in an embarrassing position, will very gladly be relieved of all further responsibility. Its members have no personal ambitions to serve and did not seek appointment. They will lay down their responsibilities as soon as informed by the power that appointed or commissioned them to do so.

In view of the facts above recited, which are in substance that the committee of the National Dental Association does not recognize the authority of the Fédération Dentaire Internationale to organize the Fourth International Dental Congress in accordance with the regulations adopted at the close of the third International Dental Congress, but purposes that it shall be practically independent of that body, thus establishing a precedent which we believe will be fatal to the aims and purposes which the Federation was established to further, and which are practically the same as those of the International Medical Congress, we believe that the best interests of all concerned demand that the acceptance of the invitation to hold the Fourth International Dental Congress in St. Louis in 1904 be formally withdrawn, but we recommend that the members of the Federation individually pledge themselves, so far as their ability extends, to attend the Congress of the National Dental Association of the United States to be held at the same time and place, and to further its interests in every way possible.

In the event that this course is not deemed advisable by the Executive Council, we ask the Federation to accept the resignation of the members of the committee of nine appointed at Stockholm, that the efforts of those representing the National Dental

Association of the United States may not be embarrassed or impeded in any way.

Respectfully submitted,

(Signed) TRUMAN W. BROPHY,
Chairman,

J. D. PATTERSON, H. A. SMITH,
GORDON WHITE, W. C. BARRETT,
M. R. WINDHORST, S. H. GUILFORD,
WILLIAM CONRAD, W. W. WALKER.

Such is, gentlemen, with documentary support, the condition of the question. The Bureau re-united has studied the question, determined on the existing rules, on the origin of the Federation, on its powers and its duties, and submits to you the following considerations:

The duties and powers of the Federation, defined by the acceptance of the resolutions presented at the General Assembly of Madrid, August 14, by the International Dental Congress of Paris, indicate to us that the Federation is commissioned to prepare and to organize the Fourth Dental Congress.

Resolution No. 11: That an International Dental Federation be formed.

Resolution No. 13: That there be named at the last sitting of the Congress a commission of nine members to examine the conditions of the constitution of the International Dental Federation to offer their adoption by the national committees and to prepare the next International Dental Congress.

Resolution No. 14: The International Dental Federation, composed of all the national committees, shall be represented by an Executive Council.

The first Executive Council, comprising nine members, shall be named by the members of the Third International Dental Congress in the General Assembly of Tuesday, August 14, and its powers shall terminate at the opening of the Fourth International Dental Congress which it is commissioned to organize. The Executive Council will name, at its first sitting, the committee of instruction. This first sitting will be held August 15 at 9.30 a. m., at the Dental School of Paris.

These resolutions, regularly adopted by the members of the National Dental Association, regularly delegated, and the divers members come from the United States to the Congress of 1900, invite in consequence the several societies participating, American or European, if they wish to form an International Congress. This title of International can only be given regularly by the Federation which is International, and consequently American as well as French, German, English, Austrian, Spanish, etc.

The fact of presenting the several invitations which have been pointed out above for adoption by the Executive Council shows distinctly that the several personages who invited recognized the authority and the proper right of the Federation, without which they would not have applied to it, and, consequently is an acknowledgment by them of the International Dental Federation's right to determine the conditions which appear necessary to it in order to assure the organization of a Fourth International Dental Congress.

Now, the F. D. I. has named a committee of nine members commissioned to represent the Executive Council for this organization. Therefore—

First. The International Dental Federation is regularly qualified to organize the next Congress.

Second. The Executive Council which represents it is regularly qualified for the same purpose.

Third. The commission of nine members, specially chosen from amongst the Americans, of whom the greater number were regular delegates to Stockholm, representing the Executive Council, is regularly qualified to organize and prepare the next Congress.

Unfortunately, at Stockholm, the decision which has been taken by the Council was not sufficiently explicit, and, in all the letters of our correspondents, whether from the committee of nine or the committee of fifteen, the letter of the Director of the St. Louis Exposition or from the Director of the Congresses, we see that the words "to assist" have been the cause, from their want of precision, of all the dispute.

In the interval of the two sessions, the Bureau did not think it was able to extend this mission. It is for the Council to state it precisely and accurately, and we think it is necessary to specify very clearly the part the Council decides to demand in the organization.

What is the limit of the work of the committee of nine? Should this committee be temporary or last till the Exposition? Should it name a committee of organization or not? Should it organize the Administrative Committee, the Scientific Committee, the Reception Committee or the Foreign Committee? These are questions which belong to you to decide clearly in order to avoid all misunderstanding.

If the Congress that is going to be held at St. Louis were a National Congress, naturally the International Dental Federation would have nothing to control in it.

If the organizers wish it to be international, they should allow the International Dental Federation to prepare the organization as it was directed to do by the resolutions of the last International Congress, and to control its organization, as much administrative as scientific, as well as the reception, which had been thought proper to take place in the future, in organizing the International Congresses.

We did not believe we should give an imperative decision for the following reasons:

First. The Executive Council, in saying "to assist," confined us to a limit from which we are unable to depart. Was it an insignificant assistance, was it an absolute organization?

Second. We thought that those who had demanded the nomination of the committee, and had themselves specified the text of the decision and the list of the members, had a well defined plan in accord with those who delegated them, that is to say, the National Dental Association.

Third. The difficulties stirred up were visibly but a pretext to conceal the rivalries of the several personalities unheard of and unknown by us.

Fourth. Not having full powers, we were running a risk in taking a too imperative decision by placing the International Dental Federation in a situation without a favorable issue for it, in case of a refusal to accept our decisions.

Consequently, we have the honor to propose for your discussion the following considerations:

The Executive Council of the F. D. I. assembled in its session at Madrid, April, 1903.

Having taken judicial notice—

First. Of the letter officially addressed to the F. D. I. by the

President of the Exposition of St. Louis, Mo., and the Director of Congresses.

Second. Of the statement of the committee of nine.

Third. Of the Patterson-Kirk statement.

Fourth. Of the report of the Secretary-General to the Executive Council.

Fifth. Of the correspondence between the representatives of the Federation and the several interested committees.

Having heard—

First. The representative of the committee of nine, Dr. Brophy.

Second. The representatives of the National Dental Association, Drs. Cryer and G. V. I. Brown.

Third. Delegates representing several organizations.

After having deliberated on them at the sessions of April 21 to April 30, 1903.

Considering—

First. That the duties and the powers of the F. D. I. are the result of the deliberations and resolutions of the Third International Dental Congress held at Paris in the month of August, 1900.

Second. That, in these resolutions and deliberations, the Congress has wished to assure the permanence of the international organization created on the occasion by the said Congress, resolution No. 11.

Third. That the Congress has wished equally to assure the continuity of International Dental Congresses, resolutions Nos. 13 and 14.

Fourth, That in conformity with the ideas expressed above, the International Dental Federation has received the precise mission to prepare and to organize the .Fourth International Congress.

Fifth. That these different decisions have been taken in a General Assembly of the representatives of all the countries participating in the Congress and notably of the delegates of the United States of America, regularly delegated by the National Dental Association.

Sixth. That the Executive Council, which represents it (the Assembly General, Third Congress, 1900) should, in continuation, fill this mission.

Seventh, That, at the session held at Stockholm in August, 1902, the Executive Council of the F. D. I. has received an invitation to decide that the Fourth International Dental Congress should be held at St. Louis, in the month of August, 1904, on the occasion of the Universal Exposition of St. Louis, Mo.

Eighth. That this invitation, regularly presented by Messrs. Truman W. Brophy, William C. Barrett and Eugene Smith, came from the Governor of the state of Missouri, from the Mayor of the city of St. Louis, from the National Association of Dental Examiners, from the Dental Association of the state of Missouri and Eastern Kansas, from the Society of Dental Science of St. Louis, from the Odontographs of Western Missouri and Eastern Kansas, from the Odontological Society of St. Louis, from the Exposition of Louisiana.

Ninth. That after mature deliberation on the subject, the Executive Council has accepted the invitations aforesaid and has decided that the Fourth International Dental Congress shall be held in the month of August, 1904, in the city of St. Louis, Mo., and has appointed a committee of nine members, composed of Messrs. Truman W. Brophy, W. C. Barrett, Eugene Smith, W. Conrad, Gordon White, H. A. Smith, W. B. Windhorst, S. H. Guilford, and J. D. Patterson, who had been for the most part accredited delegates by the National Dental Association and different other societies in close touch with the International Dental Federation; that this committee of nine members had the power to represent the Executive Council in the mission incumbent upon it to this end.

Tenth. Considering that the expression "to assist" has brought about a misunderstanding caused by confused construction, and that the too vague term has given place to several interpretations more or less, but that, in case of hesitation, the proper way was to report to the fountainhead, that is to say, to resolutions 13 and 14 of the General Assembly of the Congress (to prepare and to organize the next Congress), of which the Executive Council was unable to change or diminish the scope, and that in any case the interpretation could not be restrictive of the powers conferred upon the Executive Council by the Congress of 1900.

Eleventh. That on their return to the United States the members of the committee of nine named by the F. D. I. found themselves, at the time they were to commence the execution of their orders, face to face with a committee of fifteen members, named about the same time that the session of the F. D. I. was held at Stockholm, and unknown to all the members who assisted at this session, in one of the last meetings of the session held at Niagara Falls by the National Dental Association of the United States, to organize the Congress of 1904, in the event of the invitation being accepted.

Twelfth. That from this situation a controversy over rights has resulted between the two committees, a controversy that the efforts of the several members composed of the one and the other committee have been unable to settle.

Thirteenth. That the members of the Bureau have in vain made numerous and repeated efforts to establish harmony between the two committees and do not think themselves qualified to decide on the pre-eminence of the one or the other committee through an imperative decision taken in the interval of the two sessions.

Fourteen. That they have decided to submit the dispute to the deliberation of the Executive Council at the session of the F. D. I., held in Madrid in April, 1903.

Fifteenth. Considering, from a part of the duties and powers of the Executive Council in the organization of the Fourth International Dental Congress the above considerations result.

Sixteenth. That the different persons in sending the invitation to the F. D. I. at Stockholm to hold the Fourth International Dental Congress at St. Louis, Mo., implicitly accepted the conditions to which the organization and the holding of this Congress were submitted, in consequence of the deliberations and of the decisions of the Congress of 1900 in which the greater part of them had participated by their delegates.

Seventeenth. That if, as has been pretended, it was wished to consider the said Congress as a national affair escaping the control of the Federation or its representatives, it was useless to demand of the F. D. I. to sanction it as the Fourth International Dental Congress.

Eighteenth. That, in the last case, it was necessary to constitute it as a National Congress, with or without invitations sent abroad.

Nineteenth. That the several entities, groups or personalities who sent us their invitations have the right to be represented in the committee of organization, and that we have the right to assure their representation in the committee of organization.

Twentieth. It is precisely to avoid that the organization of the International Dental Congress may not be left entirely to a group or to a faction that the International Dental Federation has been created, in order to establish an equal representation in the commission of organization and the divers committees and to assure the assistance and the labor of all the groups that cooperate in the every-day work in order to make it a genuine International Dental Congress.

Twenty-first. That there is a cause to place it above the interest of groups; it is the interest of the future International Dental Congresses and that of the International Dental Federation which is an impersonal work and a safeguard of the professional interests of all countries.

It is there, gentlemen, that the discussion commenced. The report that I have just given you has no other object, in my thoughts, than to acquaint you with the situation in a complete manner so that you may be able to come to a decision through knowing the cause.

Decision of the Executive Council at Stockholm, Monday, August 18, 1902.

It is decided that Messrs. Truman W. Brophy, W. C. Barrett, Eugene Smith, W. Conrad, Gordon White, H. A. Smith, W. R. Windhorst, S. H. Guilford, and J. D. Patterson are appointed to form a committee destined to aid in the organization of the Fourth International Dental Congress as representtives of the Executive Council which has been named by the Third International Dental Congress.

THE DENTAL REVIEW.

Devoted to the Advancement of Dental Science.

PUBLISHED MONTHLY.

EDITOR: C. N. JOHNSON, L.D.S., D.D.S.

Subscription price $1.00 a year including postage, to all parts of the United States and its possessions, Cuba, Canada and Mexico. All other countries $1.75 a year.

THE COLLEGE OPENINGS.

By the time this number of the DENTAL REVIEW reaches its readers most of the dental colleges will have opened their sessions and inaugurated another winter's work. The importance of the character of instruction given to our students in its bearing on the future of the profession cannot be overestimated, and we fear that even among the teachers themselves the full significance of their obligations in this regard is not always fully realized. The fact should never be lost to view that for the most part the colleges are taking young men at an impressionable age when not only their professional ideals are more readily formed, but also when the molding of their characters becomes an important consideration.

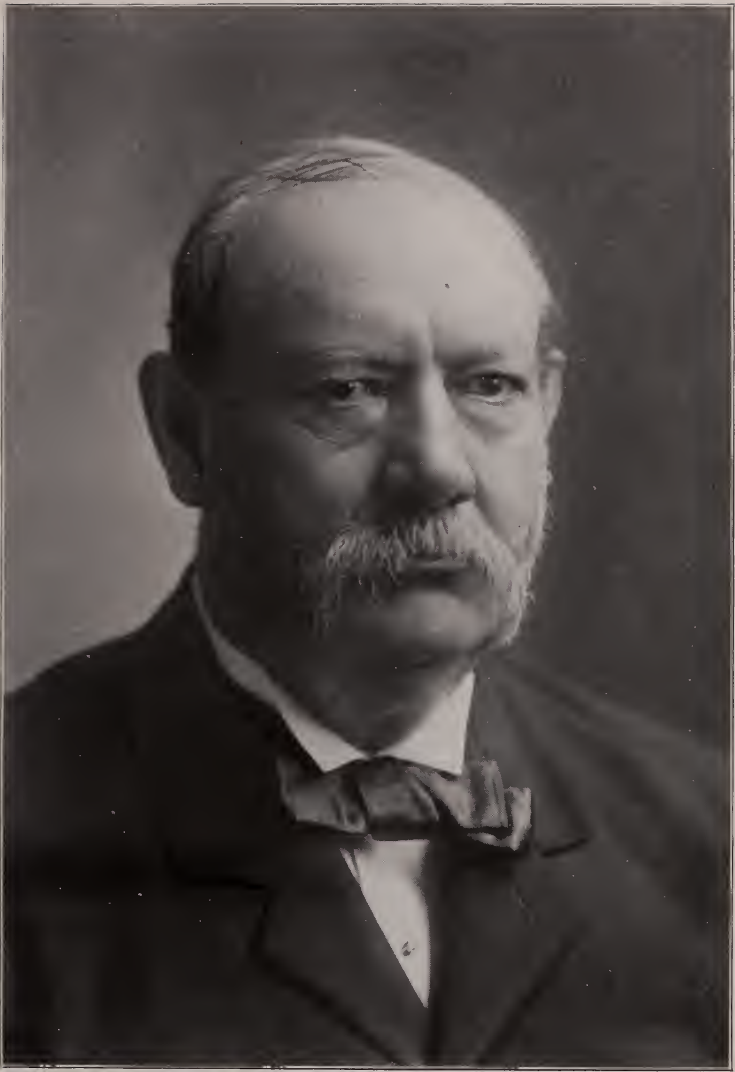
And it is to these two phases of college teaching to which we wish particularly to call attention at this time. Every teacher owes it as a legacy to his profession that the young men coming under his instruction shall be imbued with the highest sense of professional responsibility. To teach the technical and scientific branches of dentistry to a class in the most thorough and painstaking manner is only one-half the duty a professor owes to his class, and it is not by any means the larger half. There can never exist among the profession a just appreciation and recognition of the higher essence of professionalism unless it is instilled into the young men in our colleges and becomes an integral part of their daily instruction and example.

The young man of to-day entering upon the study of dentistry gets his point of view of professional life almost wholly from the college, and while these institutions should not be considered altogether in the light of seminaries established for the sole purpose of directing and supervising the moral or religious tendencies of the students, yet this feature of their developmental possibilities should never be ignored, and the teachers should aim at all times to impress upon their classes not only by word but by example the underlying principles of true professionalism and true manhood. Let us all work together with a will to make this profession of ours better and ever better, and to this end let us utilize the one great lever at our command, the large student body who are gathered in our various schools to receive instruction for the next seven months. If we could make every one of these young men a worthy, upright and professional gentleman, we should add much to the impetus for good in the profession, and the only way to do this is for the teachers themselves to have the loftiest ideals and the most exalted conception of their true function as instructors, and then live up to these ideals as a sacred duty. If a man cannot do this he should never be a professor in a college.

The Late Dr. W. C. Barrett.

There was probably no man in the dental profession more widely known than the one who in August last laid down his life at Bad Nauheim, Germany. Dr. Barrett was colossal in proportions, physically and mentally, and during his career was one of the dominant factors in the progress of the profession. He was strong minded, forceful, and very decided in his views, which is equal to saying that he made opponents. There never was a time when Dr. Barrett hesitated to express his convictions in the fullest and frankest manner, and though he lived to be nearly seventy years of age he had never learned what it was to use policy in his management of men or matters. He was either for a measure or against it, and no one ever doubted for a moment where he stood. But with all his contention for what he believed to be right, he left few real enemies, which is saying much for a man of his strong convictions.

Dr. Barrett was in many respects a gifted man, being widely read and well informed on many topics. He was one of the most brilliant editors who ever graced dental journalism and there was an individuality about his work which stamped him at once as a man above the ordinary in his line. He had a broad grasp of international affairs in dentistry, and his extensive work as chair-



Dr. William Cary Barrett.

This is a book which should be in the hands of every student of dentistry and every practitioner. If it is true, as the authors quote, that "all syphilitics are liars," then it behooves a dentist to know by definite observation how to detect this dread disease among his patients. The book is well written, concise, and to the point. It is accompanied with colored plates illustrating various phases of the disease, and next to actual clinical observation of the malady it is one of the best guides we have seen for the practitioner to follow. The book is tastily printed on good paper.

Principles and Practice of Crowning Teeth. By Hart. J. Goslee, D. D. S., Chicago, Ill. 292 pages, 459 illustrations. Published by the Consolidated Dental Mfg. Co., New York, and Claudius Ash & Sons, London. 1903.

This is the most comprehensive and detailed consideration of the subject yet presented to the profession, and it is a book that should find a place in every dental library. The author has expended much painstaking effort in presenting the various systems of crown work with the indications for or against each system. He has shown a most commendable effort to give due credit for the various ideas advanced by previous writers, and has aimed to arrange the subject matter in such a way that the reader may get an intelligent grasp of the most modern and best approved methods up to the time of writing. With the rapid evolution of crown work from its early introduction, it has been difficult for the average reader or practitioner to place a just estimate on the different ideas presented, and the profession is under obligation to Dr. Goslee for so clearly systematizing the subject. The numerous illustrations throughout the work supplement the text in such a way as to make the practical following out of the methods advocated a mere matter of personal application. The publishers have done their work well and have thereby succeeded in adding a most creditable volume to the rapidly advancing pages of dental literature.

PRACTICAL HINTS DEPARTMENT.

Edited by G. W. Johnson, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, The Dental Review, 55 State Street, Chicago, Ill.]

◆

Cleaning Files: — Saturate a tooth brush with chloroform and scrub the file vigorously. This will remove all wax and modeling compound that become clogged in the serrations.

C. J. Hadley, Chicago.

◆

A Convenient Holder in the Laboratory: — A small salt shaker is a convenient and clean holder in which to keep salt or potassium sulphate, used to hasten the setting of plaster.

A. W. Thornton, Chatham, Ont.

◆

Don't: — Don't adopt one or two-year policies, such as misleading advertisements or "slashing prices," for gaining business. The premium on such is high. It is the premium of change.

H. Darling, Sault Ste. Marie, Mich.

◆

Utilizing Worn Out Burs: — I use my old, large, round burs to good advantage by cutting them down three-quarters the distance to the shank, making thereby a bur which is useful for undercutting. Henry L. Whipple, Quincy, Ill.

◆

Embalming Paste: — I have a small cement box that contains four bottles, zinc, alum, thymol and glycerol. A speck of each of the first three named mixed with the glycerol makes a good embalming paste, if used fresh. Homer Almon.

◆

Mixing Plaster: — Many operators are careless about mixing plaster and thereby have more or less trouble with their operations. My plaster can is arranged with a sifter to which is attached a crank, like a flour sifter. The requisite amount of water is placed in the bowl and the plaster is sifted in, allowing it to become thoroughly saturated before stirring with the spatula. Casts run with plaster prepared in this manner will be smooth and free from air bubbles. J. J. Grout, Rock Rapids, Iowa.

Investment Material: — An investment material for bridge work, that will not check or break, even under rough treatment, may be made by taking long fiber asbestos (purchased from a dealer in plumber's supplies in the form of an asbestos rope), picking it to pieces with the fingers, and placing the fiber in the water, to which the plaster of paris is afterwards added. This investment dries out very quickly, will not change form and never requires to be wired or banded. It is inexpensive and one or two trials will enable any one to determine the proper proportions of water, asbestos fiber and plaster.

Arthur G. Smith, Peoria, Ill.

◆

A Quick Method of Making a Counter Die: — Take the impression with a compound composed of two parts plaster and one part molder's sand. Dry the impression thoroughly and pour in the die metal as cool as possible. When the metal has crystallized remove the die from the impression. Soften some modeling compound and place it in the bottom of a vulcanite flask. Press the die into the modeling compound, cool in cold water and separate. You are now ready to swage the metal plate. By this method lead counter-dies are dispensed with, and as all the appliances are in the office it will cost nothing to try it.

A. S. Waltz, Decatur, Ill.

◆

Method of Cleansing Root Canals: — When treating a tooth preparatory to filling the root I use a great quantity of water to cleanse the canals. One who has not tried it will be surprised to see how easily and quickly the work is done. With the rubber in position, I place my saliva ejector above the rubber dam instead of below it, and with a Moffatt syringe I wash the cavity of the tooth and the root canals thoroughly, using formaldehyde in the water, which is removed as fast as it collects in the depression of the rubber dam.

A small platinum point, such as is furnished with the Dunn syringe, attached to the end of the extra tip of the Moffatt syringe, enables one to get pretty well into some root canals and be sure that the water goes just where it is intended.

W. A. Johnston, Peoria, Ill.

Are There More Such Cases? — While in Boston recently I met John Hood, the noted gold foil maker, and he related the following incident: A dentist, now in practice, called at his depot about ten years ago, very much changed in appearance, having become reduced in weight from 165 to 100 lbs. He had been suffering with carbuncles, especially about his neck and back. Mr. Hood, having had some personal experience, asked him what condition his teeth were in. He replied that he had a number of "ulcerated" roots. Mr. Hood said, "Let me tell you something and you will not sleep to-night in consequence. Unless you have those roots removed you will not live much longer, for you are suffering from blood poisoning resulting from the abscessed roots." The dentist laughed at the idea, but some months later he returned and told Mr. Hood he had saved his life. He had not slept the night following his former interview and the next morning had the roots removed and at once began to improve, and is now well. L. P. Haskell, Chicago.

Fitting and Articulating Seamless Crowns: — Having obtained a wire measure of the root which has been prepared, select a blank shell about the size and length required, and stamp the cusp suitable for the case. If the shell selected is too tight (this can be ascertained by slipping the wire measure over the punch last used in making the shell) it may be enlarged by placing it on the punch and tapping the sides. Again adjust the wire measure to the root to obtain the exact shape, and contour the crown to suit the space, being careful to make the open end the exact shape of the root. Trim until the crown is nearly short enough and the edge of gold passes under the free margin of the gum around the root. Now turn attention to the articulation. If a cusp is too prominent press it in. If the gold is soft enough the patient may bite it to an articulation, or it may be placed upon a lead block and tapped with a small hammer. If at another point the crown does not reach the articulation place it upon the block and with a small punch press the metal out. In this way a good articulation may be secured. See that the length is correct and that the shape and size of the neck corresponds to the shape and size of the wire measure. If too large draw in with a pair of crimping pliers. Reinforce cusps by dropping in solder and holding over flame. R. E. Sparks, Kingston, Ont.

MEMORANDA.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

On account of the resignation of Burton L. Thorpe, D. D. S., president of this association, James G. Reid, D. D. S., of 1204 Trude Bldg., Chicago, Ill., will assume the duties of the president.

CHAS. A. MEEKER, D.D.S., Secretary.

NORTHERN ILLINOIS DENTAL SOCIETY.

The sixteenth annual meeting of the Northern Illinois Dental Society will be held at Freeport, October 21st and 22d, 1903. An excellent program has been prepared. No northern Illinois dentist can afford to miss this meeting.

A. M. HARRISON, Secretary.

SOUTHERN ILLINOIS DENTAL SOCIETY.

The eleventh annual meeting of the Southern Illinois Dental Society will be held in East St. Louis on October 13 and 14, 1903. An interesting program is assured and all ethical members of the profession are cordially invited to be present.

J. M. BARCUS, President.

Harry K. Barnett, Secretary, Upper Alton, Ill.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

It is earnestly requested that all the secretaries of the Boards of Examiners throughout the states and territories mail to the secretary all changes in their respective boards, and greatly oblige.

CHAS. A. MEEKER, D.D.S., Secretary.

29 Fulton St., Newark, N. J.

INSTITUTE OF DENTAL PEDAGOGICS.

The next annual meeting of the Institute of Dental Pedagogics will be held at Buffalo, N. Y., December 28th, 29th and 30th. A complete program is being arranged which will be exceedingly interesting. It will be published in full in the next issue of this journal.

W. H. WHITSLAR, Chairman.

NORTHERN INDIANA DENTAL SOCIETY.

At the meeting of the Northern Indiana Dental Society, held at Wabash, September 15th and 16th, 1903. the following officers were elected to serve for the ensuing year: President, S. B. Hartman, Ft. Wayne; Vice-President, J. A. Stoeckley, South Bend; Secretary and Treasurer, Otto U. King, Huntington; Supervisor of Clinics, L. A. Salisbury, Crown Point. To serve with the above officers as members of the Executive Committee: A. H. Wagner, Huntington; M. Wilson, Rochester; C. E. Redmon, Peru; J. W. Stage, Goshen; M. W. Strauss, Huntington.

OTTO U. KING, Secretary.

RESOLUTIONS.

Whereas, The Fourth International Dental Congress, which is to meet in St. Louis, August 29th, September 3d, 1904, under the auspices of the Louisiana Purchase Exposition is to be the greatest event in the history of dentistry.

Whereas, The Fraternal Dental Society of St. Louis is progressive and stands for the best in dentistry and its interests,

Be it Resolved, That the Fraternal Dental Society of St. Louis heartily endorses the Fourth International Dental Congress, and tenders it their aid and support as a society and as individuals.

Unanimously adopted Sept. 8, 1903.

W. L. WHIPPLE, President pro tem.

E. E. HAVERSTICK, Secretary.

SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF NEW YORK.

The thirty-fifth annual union meeting of the Seventh and Eighth District Dental Societies of the State of New York will be held at the Osburn House, Rochester, N. Y., October 27th, 28th and 29th, 1903. A most excellent meeting with numerous clinics is promised. One day will be devoted exclusively to clinics with discussions of same in evening. Application has been made for reduced railroad rates. Exhibitors desiring space are requested to communicate with the hotel or the business committee. An incomplete program follows.

PAPERS.

I. L. M. Waugh, Buffalo, N. Y.—Histology of dentine illustrated with lantern slides. C. W. Stainton, Buffalo, N. Y.—Subject to be announced. Harry L. Belcher, Buffalo, N. Y.—Subject to be announced. J. W. Beach, Buffalo, N. Y.—New remedies. Robert Brewster, Chicago, Ill.—The avoidance of opacity in porcelain inlays, and the use of oil colors in porcelain work. A. Osgood, Bath, N. Y.—The vacuum chamber. L. S. Goble, Rochester, N. Y.—Practical sterilization for the dentist.

CLINICS.

Robert Brewster, Chicago, Ill.—(a) Building porcelain inlay entirely of one body; (b) Building porcelain inlay, using different layers and colors; (c) Demonstrate the use of oil colors in porcelain work; (d) Demonstrate the swaging method of making matrices. A. S. Barnes, Oneonta, N. Y.—Partial dentures. C. H. Land, Detroit, Mich.—(a) Porcelain veneers for cement and gutta-percha fillings; (b) Porcelain veneered incisors, and an entire artificial enameling over defective teeth that is thoroughly practical and durable without the necessity of pulp destruction. H. H. Tompkins, Utica, N. Y.—A new engine bur for inlay work. I. C. Edington, Rochester, N. Y.—The use of vulcanizable gutta percha in plate work. F. M. Rood, Rochester, N. Y.—The use of a screw to support pulpless teeth. G. B. Mitchell, Rochester, N. Y.—Preparation of cavity and matrix for porcelain inlays. C. W. LaSalle, Rochester, N. Y.—Aluminum lining for rubber plate. A. E. Sager, Rochester, N. Y.—Dr. D. D. Smith's method in oral prophylaxis. C. C. Bachman, Waterloo, N. Y.—Putting new porcelain facings on bridge work in the mouth. C. W. Cochran, Erie, Pa.—Porcelain jacket or enamel crown. R. W. McDonald, Erie, Pa.—Porcelain dowel crown using Brewster's body. C. C. Sanbach, Scranton, Pa.—(a) Porcelain work using Jenkins' furnace; (b) Demonstrating use of DeTrey gold. H. W. Arthur, Pittsburg, Pa.—Readily made matrices and their application. C. H. Reynolds, Strathroy, Ontario, Canada.—Microscopical specimens from the mouth. G. Evans, New York—Method of forming close-fitting crown. Posts and cementation of crowns and bridges with gutta percha cement. L. W. Ballard, Alliance, Ohio—Country dentists, make-shifts. W. E. Jackson, New Castle Pa.—Porcelain faced gold caps for bicuspids and molars. A. McAlpin, Bradford, Pa.—Anchor screws and a new chuck for inserting them. H. C. Webb, Syracuse, N. Y.—Simple method of regulating with a rubber appliance. J. B. Snyder, Bryan, Ohio—Partial restoration of incisors using electric mallet and gold and platinum folds. C. F. Bunbury, Rochester, N. Y.—Partial lower dentines. T. J. Schimpf, Philadelphia, Pa.—Demonstrate Hammond furnace, using S. S. White's high-fusing porcelain body. C. E. Wettlaufer & Bro., Buffalo, N. Y.—Inlays. E. B. Spalding, Detroit, Mich.—An all porcelain jacket crown or the natural enamel replaced by porcelain.

The subjects of the following to be announced: J. L. R. Heichhold, Clearfield, Pa.; A. R. Van Vleck, Hudson, N. Y.; L. C. Jones, Wolcott, N. Y.

A complete program will be issued later.

W. W. Smith, Chairman Business Committee.
63 East Ave., Rochester, N. Y.

RECENT PATENTS RELATING TO DENTISTRY.

736,607. Tooth-brush appliance, Charles R. Lane, Fort Wayne, Ind.
736,650. Tooth-cleaning appliance, Jordan E. Storms, Jr., Yonkers, N. Y.
737,287. Dental mixing-mortar, Charles P. Schultz, Pawtucket, R. I.
737,616. Dental instrument, Hardy B. Harrell, Gainesville, Tex.
738,517. Filling teeth with porcelain, Roy K. Belden, San Francisco, Cal.
738,152. Dentist's tool for crimping edges of metal crowns, Edwin Betts, Newark, N. J.
738,929. Dental instrument, Andrew T. McMillin, Little Rock, Ark.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, solicitor of patents, Fendall Bldg., Washington, D. C.

THE SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS.

The next regular semi-annual meeting of the South Dakota State Board of Dental Examiners to examine applicants for license to practice in the state will be held in Vermillion, December 8, 9, 10 and 11, 1903, beginning at 8 o'clock p. m. Positively no candidates will be received for examination after the 8th.

Only those who hold diplomas from reputable dental colleges, and those having had three years of actual practice in dentistry immediately preceding the examination are eligible to take the same.

Candidates must come prepared to do all kinds of fillings. They must also bring with them teeth and necessary utensils for doing both bridge work and vulcanite work.

The examination fee is $10, and a subsequent $5 will be required if applicant is successful in passing the examination.

G. W. Collins, Secretary.

INTERSTATE DENTAL FRATERNITY.

At the annual meeting of the Inter-State Dental Fraternity, held at Asheville, N. C., on July 29th, the following officers were elected for the ensuing year.

National Secretary, Dr. R. M. Sanger, D. D. S., East Orange, N. J.
National Treasurer, Dr. Charles A. Meeker, D. D. S., Newark, N. J.
Vice-President—For Arkansas, C. Richardson, D D. S., Fayetteville.
For California, H. P. Carlton, D. D. S., San Fancisco.
For Connecticut, James McManus, D. D. S., Hartford.
For District of Columbia, Emory C. Bryant, D. D. S., Washington.
For Illinois, Hart J. Goslee, D. D S., Chicago.
For Indiana, George E. Hunt, D. D. S., Indianapolis.
For Kansas, George A. Esterly, D. D. S., Lawrence.
For Louisiana, Edmund Kells, Jr., D. D. S., New Orleans.
For Maryland, B. Holly Smith, D. D. S., Baltimore.
For Massachusetts, John F. Dowsley, D. D. S., Boston.
For Minnesota, Frank E. Moody, D. D. S., Minneapolis.
For Missouri, Burton Lee Thorpe, D D. S., St. Louis.
For New Jersey, Charles S. Stockton, D. D. S., Newark, N. J.
For New York, F. C. Walker, D. D. S., Brooklyn, N. Y.
For North Carolina, J. A. Gorman, D. D. S., Asheville.
For Ohio, Henry Barnes, M. D., Cleveland.
For Pennsylvania, I. N. Broomell, D. D. S., Philadelphia.
For Rhode Island, Dennis F. Keefe, D. D. S., Providence.
For Wisconsin, H. L. Banzhaf, D. D. S., Milwaukee.

R. M. Sanger, Secretary.

On page 818 of our September issue, in the excellent article by Dr. Weiss, the third and fourth lines from the bottom are transposed, also the cuts 18 and 22 in the illustrations

The ranks of the "old guard" of the dental profession are thinning out.

What are you preparing for the Fourth International Dental Congress at St. Louis next summer? The time is none too long to make of it a memorable meeting, and the chief burden of work must fall on the dentists of the United States and Canada. The committees in themselves cannot accomplish everything. The profession as a body must get behind the movement and force it to a successful issue. Will you do your share?

Obituary.

William C. Barrett, M.D., M.D.S., D.D.S., LL.D.

(The following obituary notice is taken from a Buffalo daily paper, and it shows the high esteem in which Dr. Barrett was held in his native city.)

"Word was received in Buffalo this morning of the death of Dr. William Cary Barrett, dean of the dental department of the University of Buffalo, in Nauheim, Germany, on August 22d last. Dr. Barrett went to Nauheim to take baths on account of heart trouble, with which he became afflicted about a year ago. He was accompanied by Mrs. Barrett, who is now on her way home to Buffalo with the body.

"The news of Dr. Barrett's death will be a great shock to the countless friends that he had in the medical and dental professions, but it will not come exactly as a surprise to them. When Dr. Barrett went away about two months ago his health was poorer than it had been in years, and his friends hoped that the baths would help him, although his condition was so poor that many prepared themselves for the worst.

"Dr. Barrett was a son of Rev. William and Hannah Cheney (Tanner) Barrett, and was born on May 13, 1834, in Monroe County, this state. He was therefore in his seventieth year.

"After a thorough academic education at Kingsville Academy, Ohio, Carey Seminary, N. Y., and Yates Academy, N. Y., for some years he was teacher in different literary institutions in the state of New York. In 1863 he began the study of medicine, but in 1864 he changed to that of dentistry, receiving the degree of master of dental surgery in 1869. He began dental practice in the village of Warsaw, Wyoming County, N. Y., and remained there until the spring of 1876, when he moved to Buffalo, and in

1887 again took up the study of medicine in the medical department of the University of Buffalo, graduating with the degree of M. D. in 1880. He also attended lectures in the Pennsylvania College of Dental Surgery, in Philadelphia, and graduated with the degree of doctor of dental surgery in 1881.

"After that time he was in the practice of his profession in the city of Buffalo. In 1885 he received the appointment of lecturer of oral pathology in the medical department of the University of Buffalo, his alma mater, and in 1890 was elected to the full professorship. In 1889 he was elected professor of morbid anatomy and pathology in the Chicago College of Dental Surgery, the dental department of Lake Forest University, the largest dental college in the West, and accepted after due consideration, but still continuing to maintain his residence in Buffalo. After that appointment he visited Chicago regularly for the purpose of delivering his lectures and giving instruction belonging to his chair.

"Upon the organization of the dental department of the University of Buffalo, in 1891, Dr. Barrett was appointed professor of the principles and practice of dentistry and dental pathology, and was elected dean of the faculty, which position he held at the time of his death. He was also one of the staff of the Buffalo General Hospital, holding the position of oral surgeon in that institution.

"From 1882-88 he was the editor of the *Independent Practitioner*, devoted to dental medicine and surgery. In 1888 it was sold, and the editor retired from journalism, but in 1891 he again entered the field as editor of the *Dental Practitioner* of Buffalo, and he held that position till the suspension of the journal some years later. Dr. Barrett made notable collections in comparative dental anatomy, and was the author of many monographs bearing upon the subject of dental medicine.

"Dr. Barrett was a member of the Medical Society of the County of Erie, of the Buffalo Medical and Surgical Association, of the American Medical Association. He was a member of the International Medical Congress which met in London in 1881; an honorary vice-president of the International Medical Congress, Washington, 1887; and of the congress of 1890, which met in Berlin. He was president of the Dental Society of the State of New York in 1875 and 1876, and of the American Dental Association in 1886. He was a member of the American Microscopical Society and honorary member of many state and foreign professional associations. Dr. Barrett was a member of the Masonic fraternity, belonging to Queen City Lodge, F. & A. M., and was a Knight Templar. He was also a musician, and was at one time in charge of Asbury Church choir.

"Professor Barrett had traveled in nearly all the countries of Europe, having crossed the ocean repeatedly for that purpose. He studied in various hospitals there, and made many additions to his pathological collection while so engaged, some of which are almost or quite unique. He was married in 1857, to Amelia Harris Ryerson, of Port Ryerse, Ont., who survives him. The couple had no children."

Dr. J. Frank Mariner.

Died—On September 13th, 1903, at his residence, 7141 Eggleston Avenue, Chicago, of heart disease, in his seventy-fourth year, Dr. J. Frank Mariner.

The many friends of Dr. Mariner will learn with deep regret of his death. He was one of the most genial and kindly among the "old guard" of the dental profession of this State. He was a close personal friend and a very great admirer of the late Dr. George H. Cushing, and the two men had many traits in common. They were both disbelievers in sham or pretense of any kind, both sturdy, strong and true. It is from such as these that early professional development in Illinois got its impulse, and we of the latter day owe more to them than we are apt to realize in the present steady growth of professional progress.

Dr. Mariner was born in Maine and removed to Ottawa, Ill., in 1857. He practiced his profession there until the outbreak of the civil war, when he enlisted in an Illinois regiment. He served through the war, rising to the rank of lieutenant major, and being appointed to General Grant's staff. He returned to Ottawa at the close of the war and resumed his dental practice, remaining there until about fifteen years ago, when he removed to Chicago. Dr. Mariner was an early member and organizer of the Illinois Dental Society, and filled successively most of its offices, including that of president. He was prominent in Grand Army and Odd Fellow circles, being a member of Columbia Post, G. A. R., and Kenwood Lodge, I. O. O. F. He is survived by his widow and two daughters, Mrs. Ethel Mitchell and Miss Belle Mariner.

SOME OLD-TIME PRICES PAID FOR ARTIFICIAL TEETH.

By Dr. Edward H. Bowne, Kingston, N. J.

An ex-mayor of New York City paid sixteen hundred dollars for an upper and lower set of artificial teeth on a platinum base (Allen's continuous gum).

An old gentleman—a boarder in the famous Hoffman House, New York City—paid the late Dr. J. B. Rich $224 for an upper set of gum teeth on a rubber (vulcanite) base. The same old gentleman paid the eminent Dr. George Evans, the author of "Crown and Bridge Work," and late lecturer in the Baltimore College of Dental Surgery, $160 for an upper set of gum teeth on rubber base. The old man was quite erratic and had nearly half a score of dentures, all practically correct in fit, made by as many prominent practitioners of dentistry, but none of them were able to fit the old gentleman's "head."

One of the presidents of the old American Gas Meter Company, of New York City, paid Dr. Evans one hundred dollars for a combination set of rubber and platinum, beautiful work, and practically perfect.

No doubt the high-class dentists of New York City are still paid handsomely for their dentures of to-day. Most of the prices we have quoted were paid some thirty-five or forty years ago.

The highest price ever paid the writer was fifty dollars for an upper and lower set of teeth on vulcanite—made in February, 1872, and in perfect condition to-day, having never cost the lady a cent for repairs.

We have examined many plates of vulcanite made by the late Dr. William Newell, and Dr. Henry A. Hull of New Brunswick, for which the patients paid sixty dollars for the double dentures. Much of the work of the two respected New Jersey practitioners is still in existence and in good order.

There is really no legitimate reason for doing cheap dentistry at the present day, and we think there is a tendency in the profession to secure better fees for their laborious and exacting labor.

EDITOR DENTAL REVIEW: WHITE HALL, ILL., Aug. 7, 1903.

With no intention of criticising Dr. Rohland's method, in your July number—for it is a very good one—the intent only is to assist in promoting the "gayety" of this old hackneyed procedure in dentistry until the *best* method of taking the bite may be selected.

It is presumed that every practitioner is animated with the hope that he will be called upon by some distinguished senator, or other dignified functionary, to supply an up-to-date denture, and thereby secure to himself prestige, honor, "a dignified fee," and "the laughter of the angels on high."

If, perchance, when the "job" is finished, he can prove to or persuade the patient that he has been beautified, benefited, and can chew *beef steak like a cannibal,* then will have been fulfilled all the requirements that will render the terms "satisfied" and "contented" synonymous.

The *best* method of securing the bite, we think, is the method described by Dr. R. Ottolengui, wherein he recommends making the vulcanite plates *first*, thin over the alveolar ridges, buccal and labial regions, and after shaping the marginal edges to form, build up on these plates with wax in the usual way, and you will have the most perfectly fitting base plates and "bite outfit"—for they are the real thing—of which I have any knowledge. Attach to your articulator and proceed as if mounting teeth with vulcanite upon a metallic base, and vulcanize again.

Advantages: Perfectly rigid and adhering base plates upon which any desired amount of pressure may be exerted in the experiment of determining the normal position of each condyle in its glenoid fossa, as when the mandible is in a state of rest. A little more time is required, but from the stage of the *bite-taking* on, you can have a fair assurance of what the finished product will be, for if the plates do not *stick* at this stage, they are not at all likely to stick at any other stage. So if failure to *stick* is proven at an early stage of our procedure, surely valuable time may be saved by going back to the beginning point *now*, rather than after much time and painstaking care has been added before the point of failure can be determined, and *all* the time and labor lost.

The *knowing* if the plates will stick, and a fair confidence that the parallelism of the two jaws has been secured—is the "Rubicon." Beyond these, all else should be a *picnic.*

T. W. PRITCHETT.

THE

DENTAL REVIEW.

VOL. XVII. CHICAGO, NOVEMBER 15, 1903. No. 11

ORIGINAL COMMUNICATIONS.

THE NECESSITY OF MORE THOROUGHLY TEACHING DENTAL PATHOLOGY AND ORAL HYGIENE IN SCHOOLS OF MEDICINE.*

By TRUMAN W. BROPHY, M.D., D.D.S., LL.D., CHICAGO, ILL.

Gentlemen of the International Commission of Education and Invited Guests.

Eight months only have passed since the close of the memorable and highly successful meeting held in Stockholm, Sweden, and we find ourselves again convened to make another step toward the ideal; the higher and better plane which our profession will surely reach by association work, and largely through the efforts of this distinguished body of educators.

And as we are assembled in the land of Ferdinand and Isabella, whose noble achievements made it possible for the people of this continent to be enlightened on the subject of the geography of the new world and its inhabitants, may we not here in the capital of Spain gather the inspiration and impetus to enable us to discover and in logical sequence develop an educational system not only acceptable to the many institutions and nationalities of the world, but make the curriculum as uniform as circumstances in the different countries will permit.

The members of this commission have much to be proud of and much for self-congratulation. When the time-honored Cambridge University of England placed upon us the seal of its approval and through the distinguished scholars at its head pointed out what should be the professional man's career from the base or foundation of his education to the apex or completion of his preparation for his life work, we felt grateful to England and to her ancient university and her famous educators for their important part in starting the work which the necessities of suffering mankind throughout the world has called upon us to perform.

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*President's address, read before the International Commission of Education, F. D. I., Madrid, Spain.

Again, when the educators of the North extended to us the right hand of fellowship and the Caroline Institute of Stockholm, Sweden, opened her doors and cordially welcomed us and tendered us the freedom of this center of learning again, we were stimulated and encouraged in the work we have undertaken.

As it was with Sir Michael Foster, Sir James Creighton Brown and Drs. Griffiths and Woodhead, of England, so was it with the distinguished surgeon, Prof. John Berg, and the famous anatomist, Professor Lindstrum, in the warmth of their welcome and material aid given us in the advancement of the work of this department of the Federation Dentaire International, and as the meeting at Stockholm was more largely attended and of more value in its results than the one preceding it at Cambridge, we may reasonably expect that even more will be accomplished in Madrid than in previous years, notwithstanding the fact that during the month of April college men in America, and quite likely in other countries, find it extremely difficult to lay down their duties and travel the great distance necessary to assist in professional deliberations.

We are honored to-day by the presence of many eminent men whom we have not had the pleasure of meeting at our previous annual sessions, and on behalf of this commission I wish to extend to you a cordial welcome and invite your co-operation and your counsel.

To select a subject for my address on this occasion has by no means been an easy matter, as there are so many questions of national as well as of international character bearing upon the professional man's life in its relation to the laity. I trust my decision to limit myself to a subject which I believe to be of the most importance will meet with your approval.

The necessity of more thoroughly teaching dental pathology and oral hygiene in schools of medicine is apparent to every dentist whose duties call him into both the medical and dental fields of practice.

The medical world is now turning its attention more generally than in years gone by to the subject of hygiene and so-called preventive medicine; in other words, teaching people how to live so as to avoid the inception of disease and thereby prevent the occurrence of sickness. The most casual reader of the present time must have become familiar with the efforts that have been made by various state boards of health in quarantining in case of the prevalence of an epidemic in one section of the country, so as to prevent infection within their respective states. More than this, milk is examined with the greatest of care, that tuberculous cows may be destroyed lest tuberculosis be conveyed through the medium of milk to those who partake of it.

The keeping of drinking-water pure has greatly lessened the prevalence of typhoid fever. It has been claimed, and with a great deal of truth, no doubt, that yellow fever has been conveyed through the medium of mosquito bites, and that it has been diminished in its ravages by the destruction of these insects.

In medicine measures are everywhere sought to prevent infection, to build up in healthy vigor the tissues of the body, and to prevent entrance into the system of substances by which the vitality may be lowered or disease may be established. Extreme care is observed in suitable bathing, which not only keeps the skin in a normal condition, but stimulates the circulation and promotes health.

As the mouth is the vestibule of the body, it is the greatest of all centers of infection. Substances taken into the mouth, particles of which finding lodgment between the teeth, soon disintegrate and produce infectious material, which, either by direct absorption into the tissues through the mucous membrane of the oral cavity, or by absorption in passing through the alimentary tract, may establish a general infection, followed by rise of temperature and systematic disturbances, varying in degree from a slight fever to most serious consequences.

It has been the experience of observing investigators that the mouth generally, more than any other part of the body, is neglected. The mother always looks to the bathing of her child until it has reached an age which enables it to care for itself, and is it not true that these mothers oftentimes, extremely careful and conscientious in the matter of bodily cleanliness, too frequently neglect the cleaning of the mouth and the teeth of their children?

It has often been said that people of education and culture, those who are well-informed on many subjects, not infrequently pay little or no attention to the hygiene of the mouth. Too frequently, I am sorry to say, the medical practitioner overlooks teaching his patients proper care of these important parts.

The teeth are the hardest tissues of the body; they were intended to serve the purposes of mastication, to render distinct vocalization and to give expression and beauty to the face through life, and yet they are more subject to diseases than any other tissues of the body. It is quite true, I believe, that the laity understand less about the diseases of the teeth than of other affections. It is also true that other parts of the body, which have been subject to disease, have recuperative powers, while a tooth that has once been attacked by decay cannot per se arrest this invasion, consequently the disease continues unless arrested by the dentist until the process of destruction is complete. Nature will heal a wound, but will not repair a carious tooth.

The loss of the human teeth is generally unnecessary, and yet millions of teeth are annually sacrificed by people through negligence, indifference, or a lack of knowledge of their proper care.

In order to ascertain the condition which prevails throughout the civilized world with reference to dental and oral diseases in the public schools, a committee, appointed by the Odontographic Society of Chicago sent out circular letters in English, French, and German to representatives of the school boards in the countries where these languages are spoken, to every city of over one hundred thousand inhabitants throughout the world.

The list of questions was as follows:

1. Are the children in the public schools of your city instructed regarding the care of the teeth and surrounding tissues?

2. Are the teeth of the children in the public schools of your city examined by a dentist, who is officially recognized by the school authorities?

3. If instruction or examination is in use in your public schools, will you kindly favor the Odontographic Society with information relative to the system employed?

(a) Details of such system.
(b) Time such system has been in use.
(c) Results, satisfactory or unsatisfactory.

We believe that the compilation of this information from all parts of the world will do much to enlighten the dental profession in its duty toward children in public schools, and for this reason we request a reply to our questions.

One hundred and sixty-seven of these circulars were sent. The number of replies was eighty-two.

The answers may be classified as follows:

1 Number where supervision or instruction were given..38

2 Number where care of mouth is taught in conjunction with teaching of hygiene and physiology....................14

3 Number where care of the mouth is included in the medical inspection by physicians..............................10

4 Number where inspection and instruction are given by dentists and physicians, but no system.......................11

5 Number that were about to inaugurate a system, and anxious regarding all details of systems existing.............12

6 Number where systems have been evolved and results published by dental supervisors............................ 7

Under the first head of the classification the largest number of replies came from the United States and England, and the second may also be included in this as well; that is, the care of the mouth was taught by the teachers who had charge of the branches of hygiene and physiology.

Third heading. In parts of Prussia and Denmark inspection is carried on by physicians who, in making general observations regarding the physical condition of the child, inquire into the condition of the teeth, together with numerous questions regarding its diet, hereditary diseases, etc., upon which report the principal makes certain recommendations to the parents.

Fourth heading. In Berlin, Germany, and Salford, Leicester, England, physicians and dentists have combined, and the dentists make regular examinations of the mouth and teeth and make recommendations for the correction of irregularities and removal of growths in the mouth, and suggest the restoration of lost tooth structure, incidental to dental caries, by the plastics. No system has been evolved, but it is encouraging, in that it shows a step of development or tendency that will eventuate in methodical work.

Fifth heading. A large number indicated by their replies that much definite thought had been given the subject, but no steps had been taken to reduce these thoughts to a working plan, and they evinced an eagerness for information as to how to proceed. This was most manifest in the replies coming from England, France, Russia and Germany, the amount of interest evidenced in the order in which their names have been given.

Sixth heading. Tokyo, Japan; Brussels, Belgium; Antwerp, Belgium; Wurzburg, Germany; Bordeaux, France; Strasburg, Germany; and Stockholm, Sweden, each have elaborate systems.

In Tokyo, Japan, in March, 1897, in conformity to the order of the Ministry of Japan, a physical examination of all students of the imperial schools was conducted twice yearly. Special attention was given to the teeth by the dentists of Japan as far as the examinations are concerned. The results so far are noteworthy in the record of the prevalence of decayed teeth, irregularities, etc., and the awakening among the Japanese to the importance of oral hygiene.

Antwerp, Belgium, presents a system in which the municipal government officially recognizes and employs two dentists to examine, instruct, and if the child or its parents or guardian so elects, administer to the dental needs. The service is entrusted to two surgeon dentists, each having twenty-seven schools to inspect every four months. The dental service is a special department of the school system, and these reports appear annually. The system was created in 1898. The service is confined to the kindergarten and what corresponds to our grammar department.

In Wurzburg, Germany, the teeth of the children of the primary schools are, according to urgent official request, examined regularly in the clinic conducted by Andreas Michel, surgeon-dentist, and, when necessary, are treated free of charge. The primary schools of Wurzburg seem to be preparatory to the state and university instruction. All children between the ages of six and thirteen are compelled to attend the primary school. The dental work is confined to this department. The character of examination and treatment seems to be thorough. The preservation of the temporary teeth to the reduction of cleft palate is included in its scope.

Bordeaux, France, April, 1898, established in connection with its sanitary inspection service a dental department in the public schools. This inspection is entrusted to dental surgeons holding diplomas from the state faculties. Duties: Semi-annual inspection limited to the dentition of the children of the public schools. They are also compelled to report in writing any defects found in the dental examination and report in writing the same to school directors. The school director in turn is required to inform the parents of the child of its dental needs. Dental clinics at Bordeaux provide for the care of the teeth of the indigent, care being taken by the law that the free service is not abused. The service of the examining dentist is gratuitous.

In Strasburg, Germany, the children receive careful instruction in the care of their teeth by dentists. On certain days they are also taken to private clinics, provided by the school authorities, for examination. Carefully tabulated reports are kept of these examinations for scientific purposes. No provision seems to have been made for the care of the teeth in these regulations.

Stockholm, Sweden. In the grammar schools, by an edict of his majesty in 1889, the care of children's teeth was provided for. The school authorities took no initiative in the examination, and it was not until the Swedish Dental Society, in 1890, proposed that the edict become effective that any activity in this department was displayed and a thorough system of examination inaugurated. The whole system seems to be devoted to the gathering of statistics for the benefit of the dental profession. The mouths of thousands of children were examined, and a fund of facts regarding the frequency of caries, the oral manifestations of syphilis, rachitis, tuberculosis, cleft palate, etc., etc., are at hand, but no effort appears for the correction or modification of these irregularities. Very elaborate reports of these examinations are at hand, and are valuable in their suggestiveness.

A table of facts regarding the condition of the Teutonic race in northern Germany is herewith submitted. The school children of nineteen towns were examined. The number of children examined was 9,725. Ninety-five per cent showed dental caries; 372 showed anomalies of various characters, including hare-lip, cleft palate, irregularities, V-shaped jaws, and but one case demonstrated congenital syphilis. Another feature of the tables showed that the left upper teeth were more frequently decayed than the right upper, and that the reverse was the case with the lower teeth. The society proposes to publish the investigation and present a copy to the German Government in the hope of getting national aid in the further prosecution of this work.

PERCENTAGE TABLE OF ALL CHILDREN.

	6-8 yrs.	9-10 yrs.	10-12 yrs.	12-15 yrs.
Number of children examined . . .	6,060	4,990	3,518	5,157
Children with perfect teeth	407(6.8%)	268(3.4%)	149(4.3%)	172(5.5%)
Per cent with caries	93.2%	96.6%	95.7%	94.5%

The facts here presented lead us to the conclusion that caries of the teeth is a disease of childhood and of youth, and that after passing to middle life and beyond it is less frequent, and the loss of the teeth later in life is not so much from decay as it is from diseases of the tissues immediately surrounding them. The most valuable service the physician as well as the dentist renders his patients is to teach them how to preserve health.

The professors and their associate teachers in medical colleges are all specialists. The professor of medicine is an internal medicine specialist. The professor of surgery is a specialist, as his specialty is that field of surgery not covered by the Ophthalmologist and Otologist, Gynæcologist, laryngologist, dermatologist, genito-urinary surgeon, etc., etc., and so medicine is divided into many departments of practice, the head of each department paying little attention to the work of the others. The only general practitioner of medicine at the present time is the physician who practises in the country, upon whom the people call for the treatment of all the ills with which they are afflicted, and it is the great majority of mankind that is dependent upon the latter class of medical men for professional advice and care, and he should therefore be able to look after all their ills.

I do not advocate teaching the medical student the technique, the art of dentistry, for this he could not learn without adding at least three years to his medical course. I believe, however, he should prepare himself while in college so that he will be able to recognize pathological conditions of the teeth and those diseases which are associated with diseased teeth and dependent upon them for their origin.

If he teaches the families under his care dental prophylaxis he will in many cases avert dyspepsia, anæmia, and other general diseases.

The medical student should be taught the origin and development of the teeth, their minute anatomy and physiology, the many morbid conditions to which they are subject, the influence of certain diseases of the teeth upon the general health, their part in forming the initial lesion of trigeminal neuralgia; how to make a correct diagnosis of dental pulpitis, pericementitis, periostitis and alveolitis; of dental alveolar abscess and its consequences, among which we may name maxillary ostitis, caries and necrosis of bone, empyæma of the antrum, injuries and diseases of the terminal branches of the fifth nerve, especially the third or inferior maxillary division and rhynitis attended with suppuration. He should be taught how to recognize excementosis, pulp nodules, inflammation of the glands, synovitis, myolitis, tumors and cysts of dental origin, etc., etc.

He should become familiar with the local irritations in the mouth, such as result from thermometrical changes upon metal fillings in teeth, and thereby recognize a common cause of facial neuralgia. He should be taught that artificial dentures, by reason of their undue pressure upon the terminal branches of the fifth nerve, especially the palatine and inferior maxillary nerves as they emerge from the anterior palatine and mental foramina, respectively, are often the cause of extreme neuralgic pain and that medication will be useless while the exciting cause remains. He should know the laws of hygiene in the broadest sense, and instruct patients and impress upon them the importance of strictly observing them in caring for the teeth of children. The medical student should be taught to observe irregularities of the teeth which often cause facial deformities, so that he may advise families who employ him professionally that the dentist's art can correct such defects. Every dentist of considerable experience knows that patients who wear artificial dentures often complain of the same kind of pain which they experienced before their natural teeth were lost and while they were suffering from pulpitis.

The prevalence of great quantities of pus exuding from around the necks of the teeth from so-called pyorrhœa alveolaris is constantly depressing the patient's vitality, and the physician should recognize this diseased condition and direct his patients to a dentist competent to employ the necessary treatment indicated in individual cases. The medical student should be taught how to skillfully treat fractures of the inferior maxilla that external bandaging is of no value, often positively detrimental, except as it is used as an auxiliary to interdental splints. Again, in the management of these fractures, he should regard the services of the dental surgeon essential in constructing and adjusting splints to secure most satisfactory results.

If medicine is "The healing art in all its branches," and if, as we believe, diseases of the teeth are more prevalent than any other diseases of the human family, the institutions of medical learning must demand that every student shall possess the same amount of knowledge of these diseases and the diseases associated therewith and dependent upon them for their origin, as the student acquires of the diseases of other parts of the body.

I do not wish to be understood as advocating that the physician should always treat the diseases named, but should acquire the same degree of intelligence in regard to their pathogenises as he does in regard to other abnormalities and direct his patients as he might if they required treatment of the eyes, the skin or the throat to the proper practitioner for the service required.

I do not charge the medical faculty with attaching too little importance to oral diseases, but, as I previously stated, each medical college professor is a specialist, and so absorbed is he in the work of his own department he does not realize how extensively through modern scientific research the field of the stomatologist has widened and how essential a knowledge of it has become in considering in a general way the ills of mankind.

By demanding that all candidates for positions in the medical departments of the armies of Spain and England shall pass satisfactory examinations in diseases of the teeth as a qualification for admission; by creating a department of dental surgeons in the army of the United States of America, this fact is recognized by some of the national governments, and it is hoped that in the interest of the men who devote their lives to the service of their countries that every nation will provide well equipped corps of dental surgeons, so that the suffering soldiers and sailors of the world may receive the skilful services to which they are so justly entitled.

As the dental college has included in its curriculum such branches of the medical studies as the student of dentistry requires a knowledge of to prepare him for his life work, so too should the medical school teach its students the essentials of dental and oral pathology and surgery to enable them to recognize the various diseases of the mouth with which they come in contact so that the most approved treatment may be employed.

The subject of this address may seem to some of you foreign to the object and aims of this commission. The name of this department of the Federation is broad enough to cover everything within the domain of education.

When we are confronted with the statistics herewith presented; when we are impressed by the fact that less than six per cent of the children of the world are free from caries of the teeth, and this intelligence becomes general, I believe that enlightened civilization will hail with joyful acclaim the advent of the day when all men whose function it is to alleviate human suffering shall have informed themselves so well that the ravages of dental diseases may be stayed in some measure at least, and that the appalling loss of human teeth may be to a very great extent diminished.

If the International Commission of Education succeeds in arousing the interest throughout the world among medical faculties, physicians, surgeons and dentists in dental pathology and oral hygiene that its importance demands, which will result in conferring upon mankind immunity from dental diseases to the extreme limit of human endeavor guided by the results of modern scientific research, our mission surely will not have been in vain.

It is my most earnest belief, encouraged and strengthened by the presence, enthusiasm and well-directed efforts of the representatives of dentistry of the various nations of the world here assembled, that by unity of purpose in our efforts to enlist the cooperation of our confreres everywhere, we may jointly contribute to the further dissemination of a knowledge of dental pathology and oral hygiene throughout the world, and thus be instrumental in preventing human suffering and contributing to the comforts and usefulness of our kind.

The Federation Dentaire International, though young in years, will be guided by men of high and noble impulses, of broad conceptions of education and professional usefulness; qualities which so conspicuously mark our distinguished confreres, the men of Europe, who have not hesitated to make immense pecuniary and personal sacrifices to accomplish a great work, and to whom we are so deeply indebted for our organization and its successful management. Whether the bonds of professional union throughout the world are to be strengthened and perpetuated by us, whether apathy, indifference and selfishness shall possess us, whether voices which assisted in creating us shall turn against us, and endeavor to bring about our disintegration; whether men of our number will attempt to rid themselves of responsibility; whether the narrow view of home affairs and their management shall be foremost in the minds of successful educators, and restrain them from extending to us their sympathy and their help; whether their home affairs in their estimation are so important that they cannot awaken to a realization of duty to the profession at large to which they are so deeply indebted; whether we are to succeed in extending to all the benefits of hygiene, health and happiness by invoking the aid of men whose life work is to administer to human ills, remains in a great measure for the members of the Federation Dentaire International of the present and the future to determine.

"As we have plucked the fruit of others' planting, let us in thankfulness plant for others yet to be." Colleagues, the work of the Federation and its departments must be carried on. We have faith in us that all educators seek the truth, and that the truths we are now sowing shall become deep-rooted in the hearts and minds of our successors, and live, and grow, and serve as a powerful factor in disseminating knowledge and promoting the health and happiness of mankind.

SOME POINTS TO BE CONSIDERED IN CONNECTION WITH THE EXTENDED DENTAL COURSE IN THE UNITED STATES.*

By W. Mitchell, D.D.S., London, England.

He would be a rash speculator in futures who would arbitrarily predict what the next quarter of a century has in store toward the history of the progress of our profession. So rapidly has event followed upon event, and method and discovery trodden upon each other's heels, that one would almost pause and inquire if it were possible for the future to have much for us to learn or for science to reveal.

The history of the dental profession since its emancipation from the barbers and bleeders of Europe in the early days of the past century, has been of a decidedly progressive nature, and in harmony with the spirit of the more recent past, the extended regime as formulated by the representative dental schools in the United States must be considered as necessary to meet the requirements of the times as appreciated by the practical teachers of that country.

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*Read before the American Dental Society of Europe, Madrid, Spain.

Our representative men have been the educators of the public in dental matters wherever they have practised, and in enlightening the public of their respective communities they have incidentally extended their own capacity, and the demand upon our colleges for advanced facilities for study and practice. This of necessity calls for a more lengthened term at college on the part of the student, and an augmentation of the staff and facilities of those institutions to meet the exactions of the present day.

Thirty years ago the means and methods at our command were much more limited than at present, our knowledge of reflex conditions less extended than now.

Drugs which are now an every-day requirement were unknown. Electricity in its varied phases of applicability was a shaded vista to us, and organic chemistry was only just beginning to claim our attention, while the wonderful possibilities of crown and bridge work have only been equaled, if not excelled, through the untiring energy and artistic temperament of Dr. N. S. Jenkins, in the delicate ceramic productions, which have given to us the nearest approach to nature in the restoration of dental tissue.

As the requirements of the times we live in are greater than they have been, it necessarily follows that the time for study must be lengthened, but as it is impossible to put more than two pints into a quart measure, so is it impossible to take an appreciable period of time out of the possible working life of a man or woman without doing them harm or an injustice, unless a useful equivalent be given them in exchange. This fact suggests the necessity of our instructors giving their curricula the most serious consideration in order that the obsolete may only be considered in an historical way, and questionable theories shown scant consideration, and only that both in theory and practice which the student can with assurance take out into the world with him and practically realize upon at once, be given to him in large and persistent doses.

I am not at all in sympathy with a certain portion of the dental press of the United States, which, while pretending to be strenuous advocates of advanced effort on the part of its institutions, takes for its standard a system based almost exclusively upon traditional theory without having taken the trouble to inquire as to its value to the student, or its application by them for the benefit of the public. Especially is this most necessary when considered from the patient's standpoint, as this is the only standpoint from which, I claim, we as a profession can justly be considered. It is by results we must be judged, and as the patient is our field of exploitation the value of our instruction, our honesty in its application, must furnish the means whereby the intelligent public may decide as to whether a good plumber may not have been spoiled by trying to make a dentist of him.

The preliminary requirements of the dental student prior to his matriculation has of recent years been gradually extended until it is time to inquire if a reasonable limit in this respect has not been reached. I am inclined to believe it has; and I say this in the very best interests of my profession.

Childhood and youth have their limits both as regards time and capacity; impress too much preliminary theory into the one and the other must necessarily suffer. In childhood and youth the receptive faculties are more easily impressed and developed, therefore if a too close application to study of a purely theoretical nature be insisted upon, and this be extended over too long a time, the powers of co-ordination will proportionately suffer, and a time never to be reclaimed will be passed, forever precluding the very best possibilities which might have been attained, had a more judicious and discriminating course been followed by those responsible for the formulation of the child's early course of study. I think the time has arrived when the censors of public education in places where a surgical operation is not imperative to facilitate the reception of a new idea will modify the course of instruction in the schools under their supervision, after possibly the first four years of the child's school life. This modification, as regards boys, will be made by a process of selection from those showing a capacity for manipulative skill and manual dexterity, demonstrated by means of facilities afforded them in simple mechanics in a primary manner, under competent teachers connected with the public school system, in much the same manner as now in vogue, but in a more advanced degree, in the technical departments of the more advanced universities of the United States. This would permit of a modification of the subsequent studies of the youth to his best advantage, formulating the curricula according to his predilection for life's later requirements, and fitting him for doing his life's work under the best and most efficient circumstances, instead of, as at present, compelling through their public school career the coming litterateur, doctor, artisan, and professional technician to take precisely the same course until at least eighteen years of age, thereby depriving them on the one hand of many years of guiding and developmental manipulative training, and in both cases arbitrarily insisting upon a common course which might be modified to the greater advantage of both.

Our profession occupies a unique position when compared with any other calling, and therefore cannot be considered dogmatically upon any preconceived lines, neither can any arbitrary course be mapped out for it by those who would endeavor to attach themselves to the fringe of the medical profession with the primary view of absorbing a little reflected dignity, to which they have neither the natural ability or acquired skill to reasonably entitle them. It is interesting to note in this connection that in those countries where dentistry has been controlled by the medical profession, or where the laws or methods have been arranged upon or approaching medical lines, the results have not been at all to the best interests of our profession. It has been in a spirit of toleration, when not of grandmotherly supervision, that its interests have been considered by those who were not in appreciative sympathy with its requirements or possibilities, and the result has been the incubation and parturition of a nondescript hybrid who does not practice medicine, and in very many cases leads one to wonder at the small amount of dental knowledge the public will tolerate in connection with a surfeit of degrees. I can honestly say during an experience of nearly twenty years in England where the method named has its chief advocacy, the very best results I have seen in the way of serviceable, correct and satisfactory operations to the advantage of the public have been from the hands of the dentist, the man of the single degree, and not from the man of the so-called double qualification, whatever that may mean, for it is difficult to conceive of any one being more than qualified to practice his profession. I am inclined to believe that the satisfactory treatment both surgically and hygienically of a putrescent pulp will be much more readily appreciated by the patient than will a profound air supplemented by rhizodontophy.

The insistence upon and inculcation of habits of continuous and protracted study on the part of those who are to become members of a severely practical profession is of questionable value.

As already stated, the powers of nervous and muscular coordination are not being developed, and the processes by which these receive their initial impulse are lying dormant, and will most likely get into a lethargic condition, and later on, when called upon, will be found irresponsive, or but feebly attuned to the requirements of the occasion, hence the necessity of this phase of our system receiving more careful consideration by our teachers than has hitherto been the case.

When we look about us, and out into the professions, where an appreciative mental sympathy combined with a perfect manual dexterity is a sine qua non, what a dearth of real representatives there is! There is rarely more than one in any branch in a generation.

Of the performers upon the violin, the piano, the harp or flute, the sculptor with his mallet and chisel, the artist with his brushes and palette, the masters in these being born, not made, even these, history tells us, devoted nearly all of their childhood and early youthful years to the development of the wonderful powers which later electrified and astonished those whom they entertained and delighted.

Dentistry calls for a high degree of resource and initiative, and for careful and exact manipulation, combined with a capacity for deduction, and an appreciation of conditions, which can only be responded to by a nervous system trained and developed early, under most careful special conditions. There can be no doubt but the tuition best adapted to bring about the conditions mentioned is a closer adherence to chemical physics, the exact and applied sciences, physiology and its chemistry, combined with the special operative and mechanical details required by our calling.

The reading in connection with the foregoing should be in the nature of a series of questions and answers supplementing the lectures upon the subjects under consideration, and stripped of much of the superfluous padding which unfortunately makes too encyclopædic what should be practical, instructive works. It is all very well to say that a student shall study this and that, and shall have this or that qualification, before entering upon his professional career, but the people who insist upon these high preliminary requirements both before and upon entering our profession, are rarely the men any of us would go to for professional attendance, for reasons already stated.

Few, I believe, have stopped to think what the tangible outcome of a superlative theoretical education is. The trend of the community is dependent upon the individual average, and the effect of the influence of institutions upon localities. With the exceptions of cities, which are comparatively few, and where the topographical position and commercial interests have risen superior to the influence of their educational institutions, the towns and villages where are located historic and representative schools, colleges, and universities, are in the same dull and lethargic condition they were centuries ago, and it seems as if an academic blight had settled upon these places when compared with others not necessarily less erudite, while more progressive; and sentiment, one of the strongest emotions the human race is endowed with, rarely suggests to the erstwhile student to make the vicinity of his Alma Mater his home, while it may ever in his heart remain a shrine at which his soul reverently worships.

In the practical age in which we live the man who can give an idea tangible form is preferred to the theorist, who rarely progresses beyond the vocal stage, hence the appreciation shown by the world toward its practical men of all ages, who rarely have been men of profound academic culture, yet who have none the less contributed to most of the beneficent facilities we enjoy at the present time.

Several factors have contributed toward preventing dentistry in the older countries shaping its own course, and promoting its own legislation and curricula; chief among these have been internal jealousies, promoting an inability to take a broad view of the ultimate possibilities of our profession, a suppliant position toward the medical profession, to whom, alas! in too many instances, dentists are indebted for their practices, instead of building them up upon their own merits, and commanding by individuality and ability the recognition conceded to other callings.

It is with extreme satisfaction that I am able to note that

Spain, of all the European countries, is the only one which has had the grasp of the situation as to the merits of our calling and its benefits to the public, and passed a law preventing a medical man, unless he supplements his medical by a dental course, from practising as a dentist. Spain, with its record of science, art and discovery, with all its old, proud traditions, has been the first country in Europe to say that a medical course does not confer the right, or capacity, to practice a profession which has hitherto been considered the ultimate dumping ground of the medical failure and all credit is due to her legislators for listening to the advice of a broad-minded dentist, and leading the way in a much needed reform, which other conservative countries must sooner or later follow.

To summarize briefly I would say: The education of the child and youth must be arranged upon a basis to best fit him for his ultimate work, with a decided preference toward the study and application of the exact sciences, in order to develop to the highest possibility exactness, observation, compulsory attention to detail, and co-ordination. This will fit him to pass a fair and intelligent preliminary examination.

In estimating the value of any preliminary or other examination, I should certainly accord that the highest consideration, the most efficient, and likely to prove of more permanent advantage when passed by a young man just out of school, unaided by any principle of coaching. Where the coaching system is in vogue there can be no doubt as to the evanescent nature of the results. The coach learns from experience practically all the questions which will be asked, and in some instances is the examiner, and places before the candidate the identical work he has coached the man in, so it is easy to see what the possibilities of such a system are.

Under such auspices the candidate is trained mentally, as the sprinter is athletically, figuratively speaking, to get quickly off his mark and run himself right out. This system of cramming or training never can make either a mental or physical stayer, so must be considered as far inferior to a system where the student's knowledge is not built up by any such false or at least questionable aids.

With regard to the extension of the time of study and work at college, this should be arranged so that the student should be able to supplement the lectures by practical courses in the various laboratories, performing as far as possible the different manipulative processes himself down to the most minute detail; this would be of invaluable assistance later on when in the operating room.

The text-books should as far as possible contain the crystallized essence of the subjects treated upon, and not be of an encyclopædic nature, as not infrequently much valuable time is wasted by the student in singling out a fact; works of reference outside of necessary text-books are usually bought after the college course by those who are really interested in any special study.

The better and more methodical equipment of the various laboratories will necessarily follow the greater developed capacity of the student, with no doubt an augmentation of the staff in respect to advanced prosthetic and operative procedures. This, with the promotion by dentists of intelligent legislation for our profession in its relation to the public instead of permitting the medical profession to dictate in matters of which they have little knowledge, and less concern, will ensure a healthy professional capacity, which will establish our calling upon a firm foundation in the mind of the public, and command a respect on the part of the medical profession which we scarcely enjoy at the present time.

It is with every confidence that I look forward to the future of our profession, especially in the United States, where its possibilities have been appreciated and developed more than in any other country with which I am acquainted. May our teachers go on in the good work they are engaged in, and may the opinion of our profession prove too strong for the scheming self-seeking politicians, who would retard the work of progress now being carried on, and relegate them to the oblivion from which chance and effrontery has barely rescued them.

As a profession we have now within our power the opportunity and means of demonstrating that we are sincere in the work undertaken in different directions by our leaders; let us reward the efforts and sacrifices they have made to uplift our calling, by our hearty and generous support, and our future will be as our past, one of onward and upward progress and prosperity.

TO WHAT EXTENT AND IN WHAT MANNER SHOULD DENTAL STUDENTS BE TAUGHT EMBRYOLOGY?*

By I. N. Broomell, D.D.S., Philadelphia, Pa.

The manner of teaching this subject to the dental student of the present day should not differ materially from that used in a medical course. It should be confined as much as possible to the human embryo. Perhaps one of the most important considerations in the study of embryology is that of a positive method of determining age, or at least to very nearly approximate this.

Information regarding the early development of the human embryo is somewhat meager and uncertain, but when this process has progressed to such a degree that the common buccal cavity is recognizable, the study of oral and dental embryology may be pursued with considerable certainty. The age of the embryo previous to this time is not therefore a matter of importance, but after this period it should be one of the first considerations. In the human embryo the age may be determined by measurement, by weight, by the appearance of certain well-defined anatomical parts, and by the disappearance of certain transitory membranes and appendages. That the appearance and growth of any organ or region of the body may be fully understood, the student should first become familiar with general embryology from its very inception, this applying with equal force to the dental as well as the medical student. Create a substantial foundation, therefore, by devoting two or three hours to the careful consideration of such subjects as fertilization, segmentation, and the germinal membrane or blastoderm.

The three germ layers of which the blastoderm is made up should be separately and collectively considered, the process of cell multiplication and cell differentiation carefully explained, and following this the derivatives of the germ layers should be taken up and completely mastered before further progress is made. In this connection the hen's egg serves by far the best purpose, as by its use the early stages above referred to, and especially the blastodermic period, can be most satisfactorily studied and apprehended. Perhaps after this the general subject should be continued in regard to the various foldings which occur, leading to the differentiation of the embryo from the fetal appendages, and the formation of the body wall and digestive tract. The study should then be carried forward to the evolution of the face and mouth or buccal cavity, and it is here that true dental or oral embryology begins. It is not now sufficient to be content with research which instructs students in regard to the teeth alone, but all parts of the oral cavity, its walls, its bony framework and its important glands should have careful consideration. This part of the work should undoubtedly be confined to the human embryo, carefully prepared sections from two or three of these being sufficient to cover the ground for use in class demonstrations, to which it should be confined. Before making sections, or using those which have already been prepared (the latter is the most practical way), the embryonic face should be macroscopically studied. During the second month the maxillary processes and the mandibular arches are advanced to such an extent that their purpose may be easily explained and readily understood, and if additional embryos, say, one at eight weeks and another at twelve weeks, are next examined, the student could not fail to recognize the manner of the formation of the mouth. After thus carefully progressing with the idea of becoming acquainted with the growth of the mouth in general, the special work of dental embryology may be taken up, this process being so similar in all mammalia that it is not required, nor is it possible to employ human embryo for the purpose. It is not possible because to pursue it very many sections are required, in the production of which much more material is needed than could be obtained from the human subjects.

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*Read before the Institute of Dental Pedagogics.

After considerable experimentation, the writer has come to the conclusion that sheep embryo serve the best purpose. They are readily obtainable, the elongated form of the maxilla is especially convenient, and while it is difficult to understand, the cells appear to be somewhat more strongly differentiated in this than in some other of the other lower animals. Unborn lambs can be obtained from the slaughter houses almost for the asking, and by measurement their approximate ages may be arrived at. Valuable as microscopic sections may be in this particular line of work, they are scarcely more so than carefully conducted macroscopic dissections.

Provide each student with one lateral half of a sheep's mandible. Instruct them to remove from this all the soft structures except the mucous membrane and underlying periosteum. Subject this to some hardening solution for twenty-four to thirty-six hours and they are ready for dissection. Do this by making an incision along the base of the bone, cutting entirely through the mucous membrane and periosteum. Continue the work by stripping the bone first from the facial and then from the lingual surface until the margins of the crypts are reached. Up to this point the operation will be simple enough, but the removal of the follicles from their bony encasements will require special and painstaking care. In order to accomplish this, it is imperative that the periosteum be included and lifted in the dissection. By careful manipulation which may include the removal of small portions of the bony cover to the underlying crypts, the periosteum may be detached from this and the follicles removed. This may in turn be dissected, and a macroscopic study of the contents be made. No other procedure will give the students such a clear idea of the sacular stage of tooth development as the foregoing. By this method the student becomes familiar with the relationship which exists between the tooth germs, the surface epithelium, and the surrounding bony structure, and the preparation for section making may next be taken up, and the results more fully understood.

With this part of the work indelibly impressed upon the minds of the students, little is to be gained by making sections in the very early stages of buccal development, especially when this has been covered by the teachers' slides previously prepared. Lambs' heads varying in length from two to seven or eight inches include all of the important stages in the development of the teeth. The work of section making should be begun on the smallest size, and gradually continued until the maximum size is reached, allowing between each stage not more than a half inch in the length of the mandible. The following technic for the preparation of material is simple, but effectual.

First. Sever the mandible from the rest of the head, and remove all soft tissues excepting the mucous membrane. The smaller bones may be placed in a hardening solution without cutting, but those of larger size should be cut into pieces, say, about one inch in length. These are next hardened by placing them in a mixture of potassium bichromate two parts, sodium phosphate one part, and water one hundred parts (Muller's Fluid). This fluid should be used in large quantities, and renewed at the end of twelve hours, until twenty-four or thirty-six hours have elapsed, according to the thickness of the specimen. Remove them from this and wash in running water for twenty-four hours.

Second. Dehydrate by placing first in 50 per cent alcohol, which is gradually increased to 75 per cent and finally to pure alcohol.

Third. Any tissue that is not to be decalcified should next be placed in cedar oil for about twenty-four hours to make the tissue take up the paraffine or imbedding material. These are next infiltrated by placing in melted paraffine for twelve hours, the bath being changed at the end of this time, and repeated for a like time, after which the final imbedding may be done.

Fourth. Tissues to be decalcified are taken from the dehydrating bath above referred to, and placed in a decalcifying solution, 3 per cent nitric acid, and 70 per cent alcohol. When decalcification is completed they are washed for twenty-four hours in running water, and again dehydrated. Decalcified specimens are in like manner transferred to paraffine bath, after which they are imbedded.

Fifth. They are now ready for section making. A rapidly-moving micratome will give best results in the way of forming ribbons in section making. Sections of these ribbons may be transferred to the glass slide which has previously been prepared, by giving it a thin coat of Miles albumen, to make the section adhere. A few drops of water are placed over them, and the slide held over a clean Bunsen burner a sufficient length of time to make the sections flatten out. At this stage of the work it is very much better to examine with a low power to see what the sections contain. If they are not such as are desired, they may be discarded, and others placed in position and examined in the same way. The slides are next placed in a moderate oven over night, with sufficient heat only to more firmly attach them to the glass slide without melting the paraffine investment.

Sixth. After removal from the oven, place in xylol to dissolve the paraffine, which will require from five to ten minutes. Take from the xylol, run pure alcohol over the sections, place in a bath of weak iodine and alcohol, gradually change to alcohol with still less iodine, and finally to pure alcohol, the iodine bath removing the crystal of corrosive sublimate. After the paraffine has thus been removed, the specimen must not for a moment become dry.

The most satisfactory staining solution, and at the same time the most easily managed, is that of carmine and picric acid. First place the slide and specimen in the carmine until the tissue is quite red, say, about one-half hour. Remove from this, wash thoroughly with alcohol, and next place in picric acid for a few moments only, then wash again with alcohol, and next cover the specimen with creosote to make it take up the Canada balsam, if this is used as a mounting medium. Pour off the surplus creosote and complete the operation by the addition of balsam and the cover glass.

Many other stains of course may be used, but little additional information is gained by so doing, and it only complicates what would otherwise be a simple operation.

PULP DIGESTION.*

By A. W. Harlan, M.D., D.D.S., Chicago, Ill.

Many methods of removing pulps from teeth have been proposed, but even now few of them are painless or perfect. The surgical removal of a pulp by the production of general anæsthesia will never become popular on account of the dangers of anæsthesia and the time consumed in the performance of the operation. There are too many teeth in the mouth to make this method a time saver.

The local anæsthetic method of pulp removal is necessarily limited, for use, upon about one-half the number of the teeth, so that it cannot be counted upon for daily practice, or certainty of total removal.

The method of disintegrating a pulp by use of the sodium and potassium process of Schreier of Vienna has not become popular for a variety of reasons, the principal of which is that it is painful and is not a time saver.

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*Read before the Odontological Society of Chicago.

The mummification process proposed by Soderberg, Miller, Prinz, DeFord and others so far fail to get that enthusiastic recognition which is accorded to all processes that have back of them the solid substance of facts. None of the mummifying processes so far proposed convey to the analytic mind the certainty that there will not be future distress and disturbance at the apex of the root, in a few years.

The poisoning of the pulp of a tooth with arsenic is older in its history than anyone in this audience, as it dates back to 1836. The reason why there has been such a dread in the public mind of what is known popularly as "killing the nerve" is that arsenic is usually applied carelessly, hastily and without due care. It is usually removed from a tooth before the pulp is wholly dead. The removal of the pulp is generally attempted too soon after the application of the arsenic with instruments not suitable for pulp extraction, and under conditions which render it impossible that the operation should be painless. The first requisite for pulp removal is pulp destruction. I mean that the pulp should be dead or free from sensibility. If the pulp is not tanned with tannic acid and glycerine or tannic acid and alcohol to reduce its bulk and abstract the moisture from it, it must putrefy or be digested in order to remove it painlessly. I place myself on record that the pulp must be removed from a tooth before the tooth is filled or before the root is crowned. All fillings, all crowns, and all bridges resting in or upon pulpless teeth should have a foundation that reaches to the apex of the root. This is only possible when the pulp has been removed from the roots. No amount of sophistry will convince me that a partially filled root or one that contains a portion of the dead pulp will be lasting, or that the possessor will not have trouble with such a tooth sooner or later, if he lives. The only exceptions are those where the root canal has been filled by the conversion of the pulp into spurious dentine or where the apex of the root has become encysted. As most of you know, I have been using papain for several years for digesting pulps. I am able at this time to tell you that in consequence of the improved methods of isolating papain, papoid and caroid that a dead pulp—one that is absolutely dead—may be digested in four days or even in less time, if it is handled properly.

After the pulp is dead and the bulbous portion is removed, the surface is washed with hydrochloric acid 1-200 and the powdered papain is applied directly to the remains of the pulp. The whole is then covered with a paper mat soaked in Price's glycerine and the cavity packed with gutta-percha or oxysulphate of zinc. In from three to four days the pulp will be digested so that it can be washed out with hydrogen peroxide or boro-glycerine water, and the roots may be filled at once. This method when applied to teeth having two or more roots may require in some cases to have a fresh application for two or three days, but in all single rooted teeth three to four days will be ample to digest any pulp. The pulp, if it has any life in it, will not be digested; the tooth will ache, and it is useless to apply any form of papain to a partially living pulp. A putrescent pulp will be digested in 24 hours if it is washed with peroxide of hydrogen and then with dilute hydrochloric acid before applying the papain, papoid or caroid. The dressing which covers this application should be punctured to allow any gases of decomposition to escape.

I hope that you will try to digest the pulp of the next third molar that you have to treat. You will find that it will take a little more time than for single rooted teeth, but the results will be so satisfactory that neither you nor your patient will regret the time, and the pulp removal will be painless.

Do you realize that the process of digesting a pulp obviates the necessity for searching after the remains of a pulp in minute root canals, causing untold agony to the patient every time a delicate instrument impinges on a portion of the pulp?

Many men in despair try to mummify or tan the remains of a pulp on account of the difficulty of its removal from small and tortuous canals. If in using this vegetable ferment you fail at first, do not be discouraged, but try again. It does not matter whether carbolic acid, creosote, alcohol or other disinfectants have been used in a tooth, papain will digest the dead pulp if it is brought in contact with it.

PRESIDENT'S ADDRESS.*

By H. J. Cole, D.D.S., Norfolk, Nebraska.

"There are men and classes of men that stand above the common herd; the soldier, the sailor, and the shepherd not infrequently; the artist rarely, rarer still the clergyman, the physician almost as a rule. He is the flower of our civilization, and when that stage of man is done with, and only remembered to be marveled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of the race. Generosity he has, such as is possible to those who practice an art, never to those who drive a trade; discretion tested by a hundred secrets; tact tried in a thousand embarrassments; and what are more important, herculean cheerfulness and courage. So it is that he brings air and cheer into the sick-room, and often enough, though not as often as he would like, brings healing."

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*Read before the Nebraska State Dental Society, May, 1903.

Such is the description of the physician by Robert Louis Stevenson, and it is the best characterization I have ever read, and as ours is a branch of that great healing art, I have thought, although idealistic, that it is a standard worthy of our best endeavor to attain. A friend who has spent some time in Europe told me that members of our profession on the continent were such broad-minded, cultured gentlemen, that they did more to stamp our principles of government and civilization upon the people of those countries than any other class of foreigners.

Our laudable ambition should ever be upward and forward. Growth is the word. We cannot become great or attain distinction by merely wishing it; neither can we become famous at a bound; were it so nearly all would take the leap. So that whatever we are or shall be as men in our different communities, is or will be gained only by daily striving for it. Nearly everything our current literature contains is how to do things, and the burden of all the lectures in our colleges is preparation of cavities, manipulation of filling materials, construction of artificial dentures, building bridges, correcting irregularities, etc., which is all well and good, for that is the principal object of the student's attendance, but certainly more attention should be given to correcting lapses from virtue, to preparation for living, to bridging abysses in the imperfect characters of so many of the great student body that is knocking for admission at the door of our profession, and to the construction of something that will abide when all else fails—an honest and upright character. When more attention is given to the character of the would-be student before he is allowed to matriculate, when the management of our great institutions are more careful in the selection of their teaching force (because a pure stream cannot flow from an impure fountain), then and not till then will the men coming into our profession be of the high standard for which we are pleading.

We note again the readiness with which the dentist impresses his personality not only upon the community in which he lives. the society in which he moves, but also upon his work. Show me the man who is careless about his financial obligations, slovenly about his person or surroundings, and I will show you one who will construct an ill-fitting and ill-finished bridge, or fill a pulpless tooth without attempting to fill the pulp canal.

Again, he should be a reader of good literature, that he may become familiar with the records and doings of the men and women of the past who have had to do with shaping the policy and life of the world, not only that he may be able to talk intelligently upon those subjects, but that he may be able to incorporate into the warp and woof of his being some of their life and energy. In no other way is it possible to become broad-minded and attain that degree of culture that the public have a right to and should exact from us. Also, he should be conscientious in all he does, giving the very best service in all he undertakes; if he does he is a real "angel of mercy," because in no calling is there greater opportunity for rendering real service to fellow-man than in our own. That is the chief aim of all true men and women. The highest type of manhood the world has never known was one of service. That is life itself.

He must of necessity, also, be a social being. Every one needs some relaxation after the racking brain and muscular work of each day. I do not mean when I recommend society that we as professional men shall follow all the frivolities of fashionable life. We cannot afford the time nor expenditure necessary to meet such demands. But I mean the society of good, sensible people, who recognize the fact that night was made for sleep. This class is the thinking class, the reading class, the intelligent class, that make men sound, sweet, and strong. These are the people who move the world and hold it in equilibrium. This circle comprises the busy people who are working in the churches in reforms of all kinds, in the sciences and arts, and the broad fields of literature and education. They are the people who are living to some purpose, and in this class I recommend you to find your friends. Is it asking too much to say that he should be truthful? Certainly not, because these other qualifications that I have just mentioned are utterly impossible unless he has this also. Dr. O. W. Holmes said, "Sin has many tools, but a lie is a handle that fits them all." Aside from its moral effect truth pays in dollars and cents.

To you young men just entering the profession, I would impress this one more qualification upon your minds, that under no circumstances should anyone be mean and stingy, but you should, by frugal and industrious habits, lay in store for your own and family's needs, when your hands can no longer provide. You should at the very beginning of your professional career, or at least as soon as you can earn twenty dollars, open a bank account, and have very great care at all times that that account is not overdrawn. Live within your income and conduct the business affairs of your practice in such a manner that from the beginning you will have established a creditable financial standing in your community. And, in conclusion, he should be pure in thought and in deed, so that he is able to stand the test, and after having passed through the fiery furnace of public opinion there will not even be the smell of fire upon his garments. These qualifications of manhood that I have referred to so briefly are, it seems to me, some of the more important ones that every dentist should possess. if he expects to measure near the standard of the characterization which Stevenson ascribes to the physician.

Give us men!
Strong and stalwart ones;
Men whom highest hope inspires,
Men whom purest honor fires,
Men who trample self beneath them,
Men who make their country wreathe them,
As her noble sons,
Worthy of their sires;
Men who never shame their mothers,
Men who never fail their brothers,
True, however false are others.
Give us men, I say again,
Give us men!

PROCEEDINGS OF SOCIETIES.

SPEECHES MADE AT THE BANQUET OF THE FIFTEENTH ANNIVERSARY CELEBRATION OF THE ODONTOGRAPHIC SOCIETY OF CHICAGO, FEB. 17, 1903.

The banquet was held at the Auditorium Hotel.

Dr. C. N. Johnson acted as toastmaster.

At 9:30 p. m., after having partaken of a sumptuous repast, the toastmaster, Dr. Johnson, called the meeting to order, and in doing so said: Gentlemen—I want, on behalf of the Odontographic Society of Chicago, to thank all of our guests who have honored us on this occasion, who have made our meeting such a grand success. We appreciate their presence at this time. I want, also, to thank the chairmen of the various committees, from whom we shall hear later in the evening, for their earnest and loyal work in the organization of this meeting. I desire to thank the clinicians and essayists who have come here, and the speakers who will entertain us this evening. All of them have our heartiest thanks.

I will not take up any more of your time, because I know you are all anxious to hear from the speakers of the evening, and I am going to call upon the first speaker to respond to the toast. "Professional Unity."

> "So we grew together,
> Like to a double cherry, seeming parted,
> But yet a union in partition."

It gives me especial pleasure to introduce the gentleman who is to respond to this toast, not only because he is a representative dentist of his own country, but because he was the first man who taught me operative dentistry when I attended college. Accordingly, I have a personal interest in this matter, and it is a source of great pride to be able to introduce to you Dr. J. B. Willmott, of Toronto, Canada. (Applause.)

Dr. Willmott was enthusiastically received. He spoke as follows:

Mr. Toastmaster and Gentlemen—I have never labored in my life under as great embarrassment as I am laboring under at this moment. There are two or three elements which constitute this unusual embarrassment. In the first place, I am very conscious of the fact that I have no ability as an after-dinner speaker. I am not an orator, nor a story-teller, and one or the other of these seems to be an essential of an after-dinner speech. I am embarrassed also because I am quite satisfied that my voice is not sufficiently strong to reach more than one-half of this audience. Unfortunately, any attempt to speak beyond the ordinary tone of voice leads to an utter failure.

I want to say to this audience, that Dr. Johnson is entirely responsible for my being here. (A voice: Good for Johnson.) There is no man in the United States who could have forced me into this position by any process I know of except my friend, Dr. Johnson. He has been so extremely kind, courteous, and considerate, that when he asked me, as a personal favor, to respond to this toast, I did not have the heart to refuse him. I came to the conclusion that if the audience could stand it, I could.

Mr. Toastmaster, I want to congratulate you on the success of this gathering, a gathering unique in the history of dentistry, successful both in numbers and in enthusiasm, a gathering characteristic of the United States, and especially characteristic of the city of Chicago. (Applause, and Hear! hear!) I was looking over a city guide this afternoon, and among other things I noticed no less than seventeen items in which Chicago leads the world, and I think we may fairly say that at the conclusion of this dental gathering an eighteenth item may be properly added, namely, that Chicago leads the world in the greatest, grandest, most successful and enthusiastic dental gathering the world has ever seen. (Applause.)

The subject assigned to me is one which, if I had the ability, I should be delighted to speak on—professional unity. I take it, this is an international unity which exists and which we hope will grow. In reading the lines of this subject, the thought occurred to me, "How beautiful a thing it is for brethren to dwell together in unity." I look into the faces probably of six hundred men, who are intensely loyal to everything that is American, to their credit be it said, who owe allegiance to a form of government, nominally, at least, essentially different from that under which I was born; who have been brought up under institutions varying considerably from those in which I have been educated, glorying in honoring a flag which is different to that of the country from which I came, and yet we are all brethren, brethren descended in the main from one common mother country, the mother of modern nations, having the same aspirations, civil and religious freedom, and having a common mission for the uplifting of humanity.

A few weeks ago I had the privilege of meeting socially a distinguished citizen of this country, and of subsequently hearing him upon a Canadian platform. This gentleman is now serving as a Methodist Episcopal minister in South Africa. He asserted on a Canadian platform and on platforms in the United States, that the interests of humanity and of civilization rest with the success of British arms in South Africa. The English-speaking nations unquestionably have a mission which no other nations have for the uplifting of the human race. (Applause.)

Coming more especially to the subject which has been assigned to me, I realize that my function this evening is that of an ice-breaker, in that I am to prepare for those who come after me.

As to the subject of professional unity, I have to say that we Canadians are under great obligations to the dental profession of the United States. Before we had any dental educational institutions of our own, a number of our professional men visited the institutions in this country and drank at the fount of knowledge, and it is not saying too much that they brought back to their own country much information and knowledge that they had absorbed, and commenced new centers of instruction, and we have developed a system of education of which we are not ashamed. It is a source of satisfaction in an audience of this kind that I, as a dentist, representing the Province of Ontario, acknowledge our obligations to the dental institutions of the United States.

I want also to acknowledge another courtesy which was extended to us by the National Association of Dental Faculties. Several years ago, without urging on our part, the Royal College of Dental Surgeons was admitted to membership, and during these years, although little frictions have occasionally arisen, we have not only been permitted to retain that membership, but I think we may say, in all frankness, we are looked upon as fairly reputable men. There are other signs which indicate a growing unity in professional sentiment. The fact that we have a deputation of some twenty practitioners from the Province of Ontario at this gathering is indicative that we feel assured that whenever we visit a gathering of dentists anywhere in the United States, we shall be met with a very hearty welcome. (Applause.) Let me say, that we have had in the past many occasions for reciprocating this friendship, and I trust we shall have many more occasions in the future. There is a growing tendency toward the interchange of professional views and professional visits, which have an effect upon our brethren in the United States, as it has upon us in Canada, which is mutually helpful and beneficial.

I do not intend to detain this audience from the pleasure of listening to the eloquent gentlemen who are to follow me, and I wish to conclude my remarks by paraphrasing slightly those lines which the toastmaster read a few moments ago,

"May we still continue to grow,
Like to a double cherry, seeming parted,
Yet a union in part."

(Applause.)

THE TOASTMASTER:

We were to have had with us this evening a gentleman (Dr. Clinton W. Strang) who was to have responded to the next toast, but who was obliged to remain away. We have, however, in his stead a very worthy representative of the East, one who has done a great deal for the clinic and for the success of our meeting. He has been one of the most active workers in the East for the interests of the Fifteenth Anniversary Meeting of the Chicago Odontographic Society. It gives me great pleasure to introduce to you Dr. H. W. Gillett, of New York, who will respond to the toast, "The East."

"Light from her native East
To journey the airy gloom began,
Spher'd in a radiant cloud."

Dr. Gillett, in rising to speak, was greeted with applause. He said:

Mr. Toastmaster and Gentlemen—Had I known, when I received Dr. Bentley's invitation to come here and help represent the Empire State, that I should also be called upon to respond to this toast, I fear that my courage would have failed me. Had I known, sir, that your introduction would be couched in the language to which we have just listened, and that my reception would have been such as you have just given me, I am sure my modesty would have overwhelmed me. But, gentlemen, when Dr. Johnson came to me yesterday, I found it just as impossible to refuse to do this as I have to ever refuse anything he has asked.

I want to take you into my confidence concerning Dr. Johnson. Last winter, when Dr. S. G. Perry opened his remarks in discussing the paper of Dr. Johnson, he spoke of him something in this way: He said, "I never think of Johnson but what those lines of Sir Walter Scott's come back to me, 'A young Lochinvar came out from the West,'" and I myself never think of Johnson now except that line comes back to me. But during the last two or three days another thought has come to me. A while ago we had some plays, one, "Mr. Barnes, of New York;" "Mr. Something, of Texas," and then there was "Too Much Johnson." As to "Too Much Johnson," it reminds me of a story that I want to tell you.

A certain Weary Walker was up before a judge, and the proceedings went along rapidly, but the judge happened to have time to give him quite a lecture, and he sailed into him vigorously, and paused, before pronouncing sentence, to ask if he had anything to say. He said, "Yes; I got something to say." He says, "Judge, you said it was bad whisky that brought me here. Now, Judge, you may be sure it was not bad whisky. There is whisky, and there is better whisky. There is no bad whisky." (Laughter.) Gentlemen, there are all the other Johnsons, good fellows, no doubt, and there is Johnson, of Chicago, and that is all there is to it. (Applause.)

Gentlemen, this is my first visit to Chicago. It has not been a matter of choice; I have wanted to come here for a long time. To be sure, you have a lot of things out here to make one hesitate about coming. You have—well, you have something we might call the Black question, which has been nearly as prolific of discussion in our ranks as the colored problem has in the South. (Laughter and applause.)

Gentlemen, it is the kind of Black that when you get up against it some of it stays with you. (Laughter.) It is the kind of Black that when you go back home, some of it is apt to rub off on your neighbors. It is such a good, honest, reliable Black that we are proud of it.

There are a lot of other things you have out here. There is a great deal of Noyes out here, but it seems to me a very satisfactory kind of Noyes. I rather like that kind of Noyes. Then, there is Ames, high aims, higher in reputation than stature. (Laughter and applause.) Then you have Drake and Cook to take care of him; and if anybody thinks Goslee ought to have been a gosling, he makes a great mistake. We know better out our way. If there are a lot of good things out here, you have been generous in sharing them; you have got all you need, but if the time should ever come when you want anything more, you send out invitations with the initials C. E. B., and this audience is evidence that they will be more effective than any C. O. D. you ever used. (Laughter.)

I have been asked to speak to the East, and I have been talking away about Chicago and Chicagoans. But I have not made any mistake in so doing. I have thought it over carefully; I have been thinking about it for some time. I have concluded that it is about time for us in the East to begin to take you Mississippi Valley chaps at your word, because if you keep on, you are likely to get ahead of us, and what a fix we would be in. I think we had better begin to call you a part of the East. (Laughter.) That is the conclusion I have come to. I have been wondering for a good while how it happens that you have so many good things out here. It must be this ozone that comes over Lake Michigan from the Northwest, of which you have been giving us a sample in the zero weather of this week. But you just wait till Dr. Curtis gets his ozone factories distributed amongst us in New York.

But, soberly speaking, the East is glad to learn from you and to stand with you side by side, and to forge ahead with you. We admire, I admire immensely, the unity that helps you to do such things as you have accomplished here this week. I think I have found out a part of your secret. I have asked quite a number how you can accomplish so much, how you got along in Chicago so well, and did so many good things, and I have been told that you worked together; that the profession came first. Gentlemen, that is an example I hope to see imitated in a great many other places. There are cities I could name where I go occasionally to see my good professional brethren; they are good fellows; they are men I like, but if I talk to them about something in connection with the profession, and mention the name of some chap in the next street, there is a chill right away, and I fear that these chills are sometimes carried into our societies. I am glad to know that this is not so out here, and I hope it never will be.

I met this winter a Southern gentleman who was familiar with all the conditions of the South; a man who has studied the different sides of the late unpleasantness, and I was very much impressed with one of his remarks. He said that if they had taken about five politicians on each side before the war began, and had strung them up to trees, we would never have had any war. (Laughter.) I want to adapt that a little bit. If the time ever comes when you have a cleft—you won't have it very long while Brophy stays with you, because he will just draw the cleft together—pass some wires through, put on a lead button, and you will go on. (Laughter.) If the time ever comes when personal animosities creep into some of your societies, and threaten to disrupt them, I hope you will take the leading politicians in your societies out and spank them soundly, and suspend them. If spanking them and suspending them from active membership for a reasonable length of time is not effective, I hope you will then disqualify them for life from holding office in the society. (Cries of "Good! Good!")

Lastly, I say to you, go on; go forward; lead us forward. Not as separate corps facing different ways, but as one grand army, sweeping, ever onward, ever upward, toward the goal.

THE TOASTMASTER:

When my friend, Dr. Willmott, got up to address you this evening, he said he was neither an orator nor story-teller. I am going to introduce to you a gentleman who is both an orator and a story-teller. The West has been bountiful in many products. but especially bountiful in magnificent men, and it gives me great pleasure to introduce to you Dr. J. P. Root, of Kansas City, Kansas, who will respond to the toast, "The West."

"Wherefore did Nature pour her bounties forth
With such a full and unwithdrawing hand."

Dr. Root was received with great applause. He said:

Mr. Toastmaster and Gentlemen—I am not a story-teller, but just a plain, ordinary liar. (Laughter.) My friend from the East and I disagree. He told you that there is "Too Much Johnson." I should say there is not enough Johnson; we want more Johnson. We have had him, and know what he is. I was surprised when I received a letter from him stating the subject of the toast, and saying that he had delayed writing so that I could not get time to answer and decline. I never decline anything. (Laughter.)

I was also surprised when I found the toasts of the evening were to be "The North," "The South," "The East," and "The West," and the last shall be first, because we have no North, no South, no East, no West. (Applause.) Teddy Roosevelt, of the East, and Freddy Funston, of the West, obliterated sectional lines, and to-day it is all one.

In speaking of the West, we shall have to go back to ancient history—away back. So we will start with the Lord. Some of you know, and some of you don't know, the Lord made the world in six days. He rested, and then made man. He rested again, and then made an improvement upon man, that most essential product of the world, woman. (Applause.) Not to flatter our friend from the Empire State, I will say, this was all done in the East. (Laughter.) But Eve was a progressive girl. She transgressed, like a good many Chicago girls, and she was punished. She moved. Did she go North, South, or East? No. She went West. (Laughter.) That was the first migration, and ever since that time all progressive migration and transgressive migration have been West. (Laughter and applause.)

According to the laws of England, our early forefathers were transgressors. They went West. They settled among a few stony promontories, such as Boston, Plymouth, etc., and started to manufacture, brewing teas, and making blue laws. They stayed there long enough to raise a few descendants; they transgressed, and went West. In looking to the West, please do not misconstrue what I say. I don't mean Missouri (laughter), for Missouri is too aggressive in her Democratic majorities to be progressive enough for the West. I don't mean California, because she is so far West that she is East. (Laughter.) Where is the West?

By the West I mean Kansas—Kansas, where, when they start things, they cannot stop. (Laughter.) Can any of you mention any other State in the Union that has three such incomparables as Mary Ellen Lease, Jerry Simpson, and Carrie Nation? Where did the longest-haired man who sat in the United States Senate come from? Kansas. They are early risers out there. They are energetic; so energetic that some of our forefathers did not have time to take their boots off when they died. Our fields are full of cowhide boots (laughter), and the wise men of the East came out there with spade and hoe and dug them out and diagnosed them as belonging to the prehistoric races. We cannot deny it; if we do, some of our forefathers' reputations would be ruined.

The sun rises in the East, but where does she set? She sets in the West, and where one sits, that is home. Where does the wind come from? Did you ever go West of the Rocky Mountains? The wind comes from Kansas—comes here. But the wind is not confined to the breezes that blow. There are other kinds of wind. Some of you look so old, as if you never were babies. But if you were, you had wind. It was wind on the stomach. Now, it is wind on the lungs.

The feeling of Kansans toward Chicago is friendly. We are alike in a great many things, for in Kansas we have two great products—rather, three great products—hell, corn and wind. (Laughter and applause.) When we come to Chicago there are only two—hell and wind. Of the great Western industries, the first is the raising of corn. We raise millions and millions of bushels a year. We sell it to you in Chicago at 20 cents a bushel, and buy it back at $2.00 a gallon. (Laughter.) I do not like to brag, but there is only one West. There is only one Kansas. Where did the only celebrated man who could twist the lion's tail come from? Kansas. Who was he? John J. Ingals. John the Baptist, years ago, went into the manufacture of pure food products, the first pure food product made. Those who are Bible historians know what they ate in those days—locusts. Who was the first one who went over the Chinese wall at the siege of Pekin? A Salvation Army lad from Kansas. Who started the War of the Rebellion? John Brown, of Kansas. We have got them all. But we do concede that there is a little land West of us. That was demonstrated this afternoon in an unappreciated manner, because I am sorry to say most of you are not educated ideally.

(Laughter.) When Brother Johnson wanted a man to write a paper, which was the cream of all of them, where did he go? He went to the West, and got Carlton. (Applause.)

But Chicago is more progressive in some things than we are. She, formerly, was of the West. I believe she is the only town in the United States that empties her sewage for St. Louis to drink. You have noticed that our St. Louis friends do not drink—water. Our progressive ideas, as a rule, are rather uncouth. At home, we wear the most beautiful flannel shirts and other trimmings, but we have not the culture of the East; we have no progressive medical ideas; we have not a single, solitary man in the West (and I know every one of them) who would dare to write a paper showing how the color of the saliva is an index in childbirth of whether it is a boy or girl. (Laughter and applause.) But we have aspirations, and, gentlemen, I hope next year, or some time in the future, you will repeat this, and I give you fair warning now, Mr. Toastmaster, that if you will write early, we will come early, and stay late. (Loud and prolonged applause.)

The Toastmaster:

There are other places besides the West and the East. The North is to be heard from. We have a fitting representative from the North to respond to the next toast, and I am very glad to introduce to you Dr. L. H. Banzhaf, of Milwaukee, Wisconsin, who will respond to the toast, "The North."

"Here feel we not the penalty of Adam,
The seasons' difference—as the icy fang,
And churlish chiding of the winter's wind,
Which when it bites and blows upon my body,
Even till I shrank with cold, I smile, and say,
This is no flattery."

Dr. Banzhaf arose amid great applause. He said:

Mr. Toastmaster and Gentlemen of the Dental Profession—When the distinguished Chairman of your Committee of Arrangements honored me by inviting me to respond to a toast so comprehensive in outline and exacting in detail as that contemplated in the general term, "The North," my emotions were many and conflicting. With gratitude uppermost in my mind for the high honor paid me, I was nevertheless amazed at the unmerited compliment. What is still worse, I was appalled at the task set before me, but I accepted.

The position in which I find myself to-night strongly reminds me of a little story which, in telling, I may spare your more tedious moments. At Joplin, Missouri, a heroic female of the Sam Jones type, while trying to arouse the sinners of that community, in order that they might depart from the error of their ways, stopped in the middle of her sermon and, picking up the Bible, said, "There is a man in this house who is unfaithful to his wife, and I am going to throw this Bible at him." She raised her arm as if intending to throw the book, and every man in the house but one ducked his head to avoid the missile. (Laughter.) It was later found out that this fearless gentleman was wholly unconscious of the danger to which he was exposed by virtue of the fact that he was deaf and dumb. (Laughter.) Wiser, indeed, would it have been for me to have ducked when I received this invitation, but having been not only deaf and dumb, but blind as well, I accepted the invitation to speak to you. I am here, and you must accept the consequences. I am to speak of "The North."

What an inspiring theme for one who is competent to deal with it! What immeasurable substances for reflection and boundless resources for expression could I avail myself of their generosity! Geographically, topographically, commercially and professionally, the North contains within its borders all that can be conceived or desired by man. We have broad fields and forests, lakes and rivers, uplands and plains, which make the picture far beyond the pen or tongue of man to outline. The steady hand of progress, stimulated by the refreshing breezes characteristic of the latitude, brings peace and happiness to the homes of all its people. Here, then, in this beautiful valley of prosperity and training shall the science of dentistry progress and develop. Here we find it has progressed and developed, for, as we look over the large professional centers, we see everywhere intelligent, skilled, and faithful workers. We are honored by having with us men of special prominence, made so by virtue of their efforts and genius. We have from across the borderland our Canadian brothers, represented so ably by men like Drs. Willmott, Webster, Thornton and Capon, with whose attainments you are all well acquainted, and do not require emphasis at my hands. From the distant shores of Lake Superior, the unsalted sea of the North, the voice of Dr. Fee is listened to and respected. There is the great commonwealth of Minnesota, with its men of power and intellect. We have every reason to expect greater things from them in the future; while here in the great medical center of the world—Chicago—the records of the Brophys and Blacks the Johnsons and Menges, the Harlans and Perrys, the Goslees and Keefes, the Bentleys and Nymans, speak to the world in language of living light to the effect that not only should dentists be proud of dentistry, but that dentistry should be proud of her dentists. In this connection, you will pardon me for a brief reference to some of the multitude of the profession in my native State. With modesty and without pretension, we hope we may be pardoned for saying that we are not wholly lacking in attainments. I am sure you will all agree with me when I pay tribute to one who, by virtue of seniority and professional courtesy, stands in the front rank of the profession. I refer to that true and tried veteran, Dr. Arthur Holbrook, of Milwaukee, familiarly known to us all as "Papa Holbrook." Again, methinks I see the aged form of Dr. Byron Douglas, of Appleton, who, while drawing to a close a well-spent life, carries with him all honors in the power of the profession of his State to bestow. As I look over the men of middle and younger years, I see the form of Dr. B. G. Marcklein, who is working along the lines of oral surgery, who is entitled to the recognition afforded him by his associates.

In conclusion, permit me to indulge the hope that in the after-dinner speeches may there be found no lines indicative of division in our beloved calling. Let us go to the North, the South, the East, and the West, and say that we have a united, progressive, harmonious and dignified dental profession. Let the occasional local and petty strifes that have arisen in the past be buried with the past, that no personal ambition calculated to revive that past will be encouraged or even sanctioned in our eyes. Let us hope that our evil star of self-aggrandizement is in the decline, and that a brighter and better one is in the ascendancy; a star better calculated to shape our destiny for good; a star whose kindly influence will encourage our efforts, and stimulate us to better and greater things. May it inspire us to higher professional ideals, more pronounced professional honesty, greater professional energy, and a broader disposition of self-sacrifice, all to the end that we may be better dentists and, therefore, better calculated to cheerfully dedicate our humble abilities to the good of mankind. (Loud applause.)

THE TOASTMASTER:

Gentlemen, the next toast is "The South." There will be a responsive feeling in the heart of every man when this toast is responded to. I have had the pleasure of being in the South and receiving the hospitality of the members of the dental profession. One of the gentlemen who showed me that hospitality is to respond to the toast this evening, and it affords me very great pleasure to introduce to you Dr. D. R. Stubblefield, of Nashville, Tennessee, who will now speak upon "The South."

"If I lose mine honor, I lose myself."

Dr. Stubblefield, on rising to speak, was very warmly received. He spoke as follows:

Mr. Toastmaster and Gentlemen—I feel that I have been highly flattered in two ways in connection with this occasion. First, that this great strenuous society—the Odontographic—should call me to fill one of its positions of honor, and, second, that of all the sons of the South I should be chosen to be her mouthpiece at this time, fills me with gratification. I wish I had the power to adequately discharge the full measure of either one of these, not to say both, phases of your pleasing compliment. Of late years it has been my great fortune to make several visits to Chicago, and I find I am becoming more and more at home, for it is home, you know, wherever the heart is, and my heart is finding my kindred and congenial souls in this great city. I look into faces before me now that have been mellowed and beautified, I might say, by the softening influence of kindly esteem. Therefore, I congratulate myself that the duty of this moment brings me again within the uplifting influence of your great metropolis, and at the same time gives me another claim upon your professional esteem and personal goodwill.

But, gentlemen, this banquet is a most fitting finale to a grand occasion. It marks the close of the most ambitious effort a purely local society ever attempted, and, better still, carried to a successful consummation. You Chicago dentists—members of the Odontographic Society—certainly have a clear title to a jollification, and the only mistake that could possibly be charged against you is that you did not reserve for yourselves the speech-making on this auspicious occasion. Unlike the pugnacious cock that shrills his world-wide challenge from the fence-top, you, gentlemen, should emulate the enterprising hen, that, having laid an egg, straightway begins to cackle over it. This ought to be your cackling time, for you have certainly laid an egg, stupendous in proportions, far reaching in excellent possibilities, and, for aught I know, epoch-making in its professional results.

But if the tangible and intangible results which may grow out of your unequaled effort are worthy of praise, what ought to be said of the spirit that prompted such a stupendous professional philanthropy as yours? Chicago may not be set on a hill, but she is nevertheless shedding around and afar the rich radiance of her professional luminance, assisting and directing the dental profession to the uttermost parts of the sea. If she does not fall down over-freighted with her own greatness, Greater New York will soon have to bow her diminished head and St. Louis will have to go West and grow up with the country. Indeed, if her wide-spreading ambition or, perhaps, I should say her ambition for wide spreading, does not abate itself, the points of the compass will be annihilated and there'll be no North, East, West, or South, for we'll all be in town, citizens of Chicago.

But mentioning that geographical part of the country called the South, reminds me of the fact that my speech on this occasion was not intended to be like Chicago, spread out over everything. Chicago, "Old Glory" and the Constitution are the only occupants of all the country, everywhere, at the same time.

The South, that I am honored to represent to-night, occupies only one of the cardinal points of the compass, and, strange to relate, does not stretch across the country from side to side, at that. Between the Rocky Mountains, or even the Mississippi River, and the Atlantic Ocean, and from the Gulf of Mexico to—say, Chicago—you will find the South, if you can find it anywhere at all. In this day of a reunited country, not to mention an English-speaking consolidation, there is no North or South. The North or the South is a sentiment existing in the mind in every part and locality in the Union. It is like the "Ayes" and "Noes," separate and distinct from each other, and yet forever based on a changing condition or state of mind at any special time, yet interchangeable forever when the reason for it exists.

Coming, therefore, from a remote part of your country, with whose manners and customs you are almost totally unacquainted, it affords me great pleasure to attempt your enlightenment. Did it ever occur to you that many, if not most, of these intelligent persons before me know more of the other side of the ocean than they do of the actual life conditions prevailing in what is known as the South? Many of you have taken short trips to and even through that section; some of you may deem yourselves actually informed as to the prevailing thoughts and sentiments, but you are not. You have all heard, doubtless, of her sunny skies whose fleecy clouds mirror themselves in the shining waters of her thousand streams; you have heard of her fair daughters whose matchless charms beggar the language to speak their loveliness; and you must all pardon the pride that is taken in the traditional chivalry that is the boast of her valiant sons. These things have been the theme of eloquent tongues and the inspiration of ambitious writers from the foundation of the republic. But the South you do not know is the South of to-day. That section of your country and mine, with which I am more intimately associated than you, lies beneath the same over-arching sky, is controlled by the same Constitution, and defends the same glorious flag of freedom. For forty long years she has been traveling through the wilderness of devastation, but she stands to-day on the trembling dawn of a new and better era. The golden bars of the rising sun of her prosperity are shooting above the horizon like another aurora borealis. Manly Enterprise has wedded Marvelous Resources, and the fruits of that union are already filling the horoscope of her future with unlimited promise. The musical hum of industry has begun to fill the air and the smoke of manufacture has begun to darken the heavens. The fretting torrents of her mountain streams are chafing at the bit, eager to drag that sleeping demigod Electricity into the full meaning of modern wakefulness and tireless activity. The cry is no longer to the West for opportunity, but to the South, where opportunity stands with outspread arms to give you greeting. Her professional promise is no less bright. The standard of appreciation of our professional excellence and the measure of our ability to meet that demand does not fall below that of any other part of the Union If we have no Odontographic Society, we have the professional acumen to hail such an institution with proper and discriminating acclaim. We stand ready to uphold your efforts by words and deeds, and the day will never come when you will fail to awaken cordial response to every lofty aim and worthy aspiration.

In dentistry, as well as in every other reach of human interest, the pulsating springtime of wonderful progress and development is firing the blood of every loyal son of the South, yet from the bottom of our hearts, instinct with hereditary hospitality, we greet you as brothers and say to you it is all yours when you will come to enjoy it with us.

Dr. B. Holly Smith, of Baltimore, Md., responded to the toast, "The Ladies."

> "And Nature swears, the lovely dears
> Her noblest work she classes, O;
> Her 'prentice hand she tried on man,
> An' then she made the lasses, O."

Mr. Toastmaster and Gentlemen—I am reminded of what happened to another man. He was asked at a crowded reception to play the piano. "Not before all these people!" "That's just it, I want to get rid of some of them." (Laughter.) Now, this is the attitude of the Toastmaster. Mine is like an Irishman who, upon meeting his friend, was accosted with, "Why, Pat, hev yez lost yer job?" "Naw, I fill from the ninth story of a buildin' yisterday and I got mad and quit." "Ah, Pat, yez was always too sensitive." Now, I'm not particularly sensitive, and I'm not jay enough to come all the way from Baltimore to Chicago to fall off the top of a little weezen nine-story building, but I've encountered something quite as intimidating in the shape of a swift swat of hospitality. (Laughter.)

I have an infinite sympathy for the ignorance of old Farmer Hulltrooth, who remarked to his wife: "This here paper sez that a man in Chicago unloaded 50,000 bushels of corn one day last week in Chicago. Now, Marier, you know as well as I do that there ain't enny man in the hull State could do that much work in one day." He evidently had not the faintest conception of how you fellows can handle grain and its products.

I am a little disappointed that in the arrangement of the toasts regard has been had to representatives of sections. Should I carry out this idea and respond to my toast in sections, I should be forced to resort to some such doggerel as this:

There were three young ladies from Birmingham;
I heard a sad tale concerning them.
They stuck needles and pins
In the Reverend's shins,
Of the Bishop, while he was confirming them.

Or

There was an old maid from Trenton;
She dropped her false teeth and she bent 'em;
She remarks, "I don't care
For the wear and the tear;
They're not mine, nohow,
I just rent 'em."

Or

A comfortable wife of the West;
Is satisfied well with the best.
She jaunts far and near
On a million a year,
And cares not what happens to the rest.

But I prefer to talk to the toast, as it is most in our minds, Woman, the world over.

"Time, change, misfortune, ingratitude,
Would leave her the same;
What state could fall, what liberty decay,
If the zeal of man's noisy patriotism
Were as true as the silent loyalty of a woman's love?"

Someone has said,

"God be thanked the meanest of his creatures
Boasts two soul-sides—one to face the world with,
One to show a woman when he loves her."

I wrote your Toastmaster that I was always ready to talk to a woman, but of her—well, that is a different thing, and a little out of my line. Sure it is that all my instinct and associations prompt me to speak, if of her at all, with admiration and love.

Hutchinson says:

"There's a song everywhere, if we listen,
When the heart's brimming over with love;
There's a smile in the dewdrops that sparkle,
Like the gems in the azure above.

"There's a joy in the radiant sunbeams,
When the heart's brimming over with love;
When the golden lute, Fancy, allures us,
Twining 'round us the fetters she wove.

"There is music in woodland and streamlet,
When the heart's brimming over with love,
And the song in our hearts is the echo
Of strains breathed by angels above."

In no other way can I talk to the toast, but I like to hallow the feeling with a few chaste verses, written by an Irishman. I like an Irishman sometimes. These are the lines:

"Happy is he whose sweetheart
Is wife and sweetheart still—
Whose voice, as of old, can charm;
Whose kiss, as of old, can thrill.

"Who has plucked the rose, to find ever
Its beauty and fragrance increase,
As the flush of passion is mellowed
In love's unmeasured peace.

"Who sees in the step a lightness;
Who finds in the form a grace;
Who reads an unaltered brightness
In the witchery of the face,

"Undimmed and unchanged. Ah! Happy
Is he, crowned with such a life,
Who drinks the life, pledging the sweetheart,
And toasts in the sweetheart the wife."

Of woman's beauty and charm, power to please, and right to command, we must all have but one opinion; 'tis old as the hills and fresh as the first breath of the violet with which spring carpets them. I like the way it is put by A. J. W., in Life. He says: "Long, long ago, when the footsteps of men and women first began to beat along the path of life, the god of Love came down from Heaven to dwell with them. It was before the days of archery, but Love could sing, and so, instead of wounding human hearts by shooting passion-tipped arrows into them, as he does nowadays, he lifted up his voice and sang; sang till the women looked up and held their breath to listen—till the men could not rest for the music throbbing in their hearts.

"Love's wonderful song has been vibrating along the ages, the most divine thing the human heart can know. When the wistful sweetness of the music reaches a woman's ears, it fills her heart with a gladness which has no like in Heaven. Sometimes the song is faint and far away, as if its broken measures were being practiced on wandering wind harps by untutored fingers. But where Love truly abides the song grows strong and stays, teaching happiness, goodness, patience; making men willing to die for it—making them into the big-hearted, unselfish, gentle lovers—the Hims to whom all women pay loyal and tender homage, silently, in their hearts.

"When the shadows of life lengthen and one, grown weary, ventures out into the unknown, the deathless song of Love seeks its way across the barrier of the eternal and pours its balm into severed hearts, soothing, healing, comforting." (Applause.)

THE TOASTMASTER:

This occasion would be incomplete if we did not hear from a gentleman you have heard from through the mail, and I want to introduce to you Dr. C. E. Bentley, Chairman of the Program Committee.

Dr. Bentley arose amid the plaudits of the audience. He said:

Mr. Toastmaster and Gentlemen—There is no justification at this hour to call into further evidence any member of the Program Committee. We have been sufficiently in evidence. There should be a time when even the members of a Program Committee can say to you, "Thus far shalt thou go, and no farther," for we have served you in season and out of season, and I think the time has come when we have earned a rest. I presume it would seem discourteous on this occasion did not the Program

Committee, in some humble way, acknowledge their gratitude for the co-ordinating and collaborating forces that have made this splendid meeting a success.

About eight months ago the Program Committee commenced to project a movement which has terminated in a meeting of the kind you have been attending for the last two or three days. But such a result would have been wholly impossible had it not been for the aid extended throughout the country. It is only for that excuse that the Toastmaster has called upon me to acknowledge our gratitude for this aid.

The forces back of the Odontographic Society started out to make this affair just what it has been. Five years ago the Odontographic Society gave a clinic at its tenth anniversary, which approached, if not surpassed, any other large dental meeting that has ever been given in this country, and a year ago we proposed to excel it, if possible. You are here as living witnesses of our great success; but we would not have succeeded so admirably had it not been for the many active and enthusiastic workers all over the country. I would like to say to you that while there were some who were apathetic, some who were doubtful, there were others who were enthusiastic from the first. Possibly that apathy can best be illustrated by a letter I received from Dr. Kirk. When our literature was about to be launched upon the dental world, he notified me that, on account of previous engagements, it would be impossible for him to come to this meeting. The Program Committee had discussed with serious deliberation the choice of the men who have presented to you these excellent papers, and Dr. Kirk was one in the foremost ranks for our choice, because of the work he has been doing. Immediately the great machinery was set in motion to bring pressure to bear upon Dr. Kirk. Letters were written, telegrams were sent, and emissaries were despatched to him, until finally, within three days after the machinery was set in motion, Dr. Kirk said, "For God's sake, tell that man Bentley I will bring my family and stay all winter, if he will stop." What has occurred in Dr. Kirk's case has likewise occurred in many cases in the United States. But, as I have said, there were some who were enthusiastic from the first.

I want to say a word or two in reference to the Odontographic Society, which was born fifteen years ago. At that time, thirteen gentlemen, who were graduates of the Chicago College of Dental

Surgery, met in a humble dental office, where, if an inventory of the furniture had been taken, would have amounted to a sofa, three wooden chairs, etc. They did not know what they exactly wanted to do. They were inspired to do something for their professional welfare, and this society was born in that office. Within a year it had increased its membership to something like sixty, and at the end of five years it was a lusty society. At the end of the seventh year some of the gray-haired members of the profession began to come in. At the beginning it was an organization for young men to prepare them for the larger societies, and, better than all, to keep the young men within the path of ethical conduct. But after eight years of life, Dr. Brophy commenced to sneak around; Dr. Harlan came in; Dr. Black came also, and wanted to know what we were doing, and finally they found us so interesting that they applied for membership. But we put them on the honorary roll of membership, where they grace that list today. At the end of the fourteenth year this lusty infant, born fifteen years ago, with the unlucky number of thirteen, has upon its active membership roll over four hundred dentists, the largest local dental society in the world. (Applause.) This may seem like an idle boast. What have we done? I will tell you what we have done. The Odontographic Society of Chicago, and I have said it before, is responsible, in my opinion, more than any other force in this community, for the cohesiveness, for the unanimity of purpose that actuates the dentists of this community. It has absolutely eliminated the politician. It has no particular ax to grind. Personal ambitions are subordinated for the weal of the society and the interests of the profession in this society are best served. That has been one of the ambitions of this society, and how well it has fulfilled it you can all see for yourselves. It speaks in more eloquent terms than I can indicate.

This meeting has taught me one thing, and that is, that such meetings can be made possible so long as there is unity of purpose and the subordination of self in these communities. Chicago is not capable of doing any more than any other city. If you get cohesiveness, co-operation, and the submergence of self in other cities, you can do equally as much as we have done here.

Again, I wish to thank you all for your presence, and the gentlemen from the various cities and States for what they have done so magnificently. (Applause.)

The Toastmaster introduced Dr. George B. Perry, who said:

Mr. Toastmaster and Gentlemen—I feel that, owing to the lateness of the hour, it is out of place for me to take up the time of those who are so much more capable of interesting you. I believe I voice the sentiment of the Chairman of the Program Committee in regard to the high appreciation we have of the tremendous amount of work which has been done by outside members. I desire also to express our appreciation to the exhibitors, for the manner in which they have co-operated with us financially as well as in other ways in making the meeting as great a success as possible. We feel they have been one of the three cardinal features of the meeting—essayists, clinicians, and exhibitors. I want, personally, in my executive capacity, to express my appreciation of the work that has been done by the dental houses, the manner in which they have assisted us in advertising the meeting, and in coming to the front on various occasions, when called for. I thank you very much for this opportunity of expressing myself on behalf of the Executive Committee. (Applause.)

Dr. R. Ottolengui, of New York, spoke briefly. Dr. Charles J. Sowle, of Rockford, Illinois, recited "The Old Grind-Stone." Dr. George Field, of Detroit, Michigan, recited a parody on "The Old Oaken Bucket."

Dr. Thornton, of Chatham, Ontario, proposed a vote of thanks to the man who had presided over the greatest assembly of dentists the world has ever known—Dr. Johnson—which was followed by singing, "For He is a Jolly Good Fellow."

At this juncture, the Toastmaster appointed Dr. George B. Perry and Dr. C. E. Bentley to escort the newly-elected President of the Society, Dr. Fred B. Noyes, to the Chair.

Dr. Noyes was warmly received on taking the Chair. In a short, but very appropriate, speech, he thanked the members for the distinguished honor conferred upon him in electing him as President of the Society.

Dr. Root, of Kansas City, Kansas, proposed three cheers for the Odontographic Society, which were heartily given.

After a short speech by Dr. Cyrus M. Gingrich, of Baltimore, Md., the audience dispersed.

CHICAGO DENTAL SOCIETY.

Regular meeting, Chicago Dental Society, Tuesday evening. May 5, 1903, the President, Dr. Don. M. Gallie, in the Chair.

Dr. F. M. Richardson spoke on "Anæsthesia for Dental Purposes," as follows:

I am expected to read a paper this evening on dental anæsthesia, and I must confess that I hardly know what I am going to say. I have not prepared a paper, but will talk to you instead. I will speak first of local anæsthetics briefly, and finally on nitrous oxide. I do not believe that the profession as a class pay enough attention to painless dentistry. I believe that it is possible, with our modern methods, to practice practically painless dentistry. Our patients, as a rule, are fearful of going to the dentist for treatment. They put it off as long as possible, and the result is that their mouths often get in a deplorable condition and a crown or plate is the best that one can do. With painless methods they would come to us sooner, and many teeth would be saved that are now lost. One of the prominent men in the profession told me that he has been successful with the following method: If he has a painful operation to perform he instructs his patient to take one of the coal tar products, say, ten grains two hours before the operation and five grains immediately before the operation, and in that way he is able to prepare the most sensitive cavity practically without pain to the patient. I believe that this is a good idea and it would be well for some of us to follow it. I have made use for the last year or two of Dr. A. C. Hewett's method of giving chloroform, and I have a great deal of faith in it. I have used it a number of times with very great success and have seen Dr. Hewett give it. Dr. Hewett has used this method for forty years and has been very successful indeed with it. I think most of you are familiar with the method. He gives it from a wide-necked bottle, starting in very slowly, the patient in an upright position; he closes one nostril and instructs the patient to breathe a deep, full breath through the nose, gradually bringing the bottle closer and closer to the nostril. In five minutes or less the patient is in a condition for any minor surgical operation—preparing a sensitive cavity, the removal of a pulp, etc. I think Dr. Hewett's method should receive careful attention. King Edward, in his late operation, was operated upon under the analgic influence of chloroform. I know there are many in the profession who have very little confidence in Dr. Hewett's method, but I think an experience of forty years should count for something. Dr. Hewett is an intelligent man, and has made this his life study, and it should receive consideration.

In regard to local anæsthetics, cocaine is the basis of them all, I think. It cannot be denied that one gets very nice results with some of them, but I have seen so many bad results from their use that I do not use a local anæsthetic in my practice at all, using gas entirely. I think possibly that much of the bad effect from local anæsthetics is due to uncleanliness on the part of the operator. If one would take care every time to sterilize his needle and also the tissue to be operated upon, I think that a large percentage of the bad results would be overcome. Again, if one would select his cases, taking only a full-blooded individual with a good circulation, much better results would be obtained, but to give cocaine to everyone, sooner or later you will have bad results.

In regard to nitrous oxide. Up to two years ago there was but one way of giving nitrous oxide and that was with the old-style inhaler, where practically all the air was shut off, the patient simply being asphyxiated by the amount of gas given. The patient went to sleep in a very short time, the mask was thrown aside and we had about thirty seconds in which to operate. Now, you all know, if the operation is to be severe, the operator does not have sufficient time in which to operate. It is simply a case of grab; possibly you get the tooth and possibly you do not. If the operation is a long one, in most cases your patients will tell you that they felt the latter part of the operation. Some two years ago Dr. Hurd of Cleveland discovered the method of giving plenty of oxygen with the gas, so he devised a little nose-piece to go on over the nose. The patient's mouth is propped wide open, the patient getting all the oxygen from the air necessary. It does take a little longer with the Hurd outfit to put your patient to sleep, due to the air given with the gas, but the respiration, appearance, and pulse are all normal, in fact, your patient is in a perfectly normal condition. The only way I am able to tell when my patients are asleep is to tell them to move their finger slowly up and down until they can no longer move it. And I do not think in the last year of my practice that I have had two patients say to me that I have hurt them at all, and I have taken out from one to twenty-nine teeth, and have kept my patient under the influence from one to twenty-five minutes. The physicians have not at the present time taken this up very extensively, because they do not know its possibilities. The physician that knows anything at all about nitrous oxide remembers that thirty seconds is about the limit, and that is not long enough to enable him to perform any of the operations that he desires, and the result is that the medical profession knows absolutely nothing about the possibilities of gas. Now, like all new things, the Hurd outfit had its weak points. One was that it took more gas than the old method; another one was that it took longer, perhaps twice as long, to put the patient under; another one was that we occasionally meet with a patient who cannot breathe through the nose. I think I was one of the first to use the Hurd outfit in the city, and for two or three months I could not quite make up my mind that it was a complete success. But as experience taught me how to use it, I discarded the old inhaler entirely and relied on the Hurd outfit, and now I could not ask for better results than I have been able to get with it for the last two years. I feel that it has done a great deal for me. I do not mean to say that I never have met with a failure, because I have; we meet with failures with any outfit, with any anæsthetic, local or general. I have made some changes in the Hurd outfit which I shall show you in a moment. As a rule, it takes about a minute and a half to put a patient to sleep, and when they are asleep you can hold them as long as necessary, whether one minute or thirty, and it is not a game of grab, as you have plenty of time in which to operate. I have added to the Hurd outfit a little valve. I found some of my patients were not getting enough air; they did not breathe through the mouth at all, so I took out one of the valves and put in this little valve, and with it I can regulate absolutely the amount of air I want my patient to get. Now, there is a class of patients who cannot breathe through their nose at all, or a class who breathe partly through the nose, but not well. I have added a mouth-piece. That practically becomes the old outfit, and with this you can put a patient to sleep just as soon as you can with the old outfit, and with no more gas. If the patient cannot breathe at all through the nose, I simply take out this valve and insert it in the mouth-piece. So, you see with this modification of the

Hurd outfit the patient can either breathe through the nose alone, through the mouth alone, or both together, and I think I have overcome all of the weak points of the outfit and still retained all of the strong ones, and I really believe that this is as near an ideal gas inhaler as ever will be put on the market. There are some patients who you cannot give gas to; you will occasionally meet with a patient of that kind, but in the large majority of cases this outfit certainly will do all that is claimed for it.

Dr. A. Brom. Allen:

I am placed in rather an embarrassing position after Dr. Richardson's talk on the "only method." I have here a nitrous oxide gas inhaler that Dr. Slonaker and also Dr. Thomas of Philadelphia have used for years, i. e., the principle is the same, only I have done away with the feature of hard rubber as much as possible by making it of aluminum. It makes a neater-appearing instrument, and renders sterilization possible. Dr. Slonaker's was made all in one piece; there was no possible way of sterilizing the mouth-piece. I have made these mouth-pieces detachable, so that after an operation the mouth-piece can be taken out and sterilized. This method, as I have stated, has been used for years. Of course, when Dr. Richardson speaks of covering the whole face he has reference to the hood, and I will agree with him in some respects. I used to operate with the hood and have found it a very disagreeable inhaler, because it does cover up so much of the features, and you do not know whether you are excluding all of the air. The profession have learned nowadays to save the teeth, and of course those cases of a great number of teeth for extraction are rare, and therefore I find, in my experience, the mouth inhaler by compressing lips and nose, much better and quicker. If you want prolonged anæsthesia, put your patient completely under the gas, then allow the lips to open up and the patient to take five or six inhalations of oxygen at once, then put them under, and you have a prolonged anæsthesia, fully double the time that you would ordinarily. And of course a great deal depends on the operator; if the operator is skilful he can do satisfactory work in that time. If you wanted to continue anæsthesia for thirty minutes you could do it by this method by simply giving them gas, and not allowing them to become conscious, which is often done in cases of impacted third molars. I cannot see for extraction in the majority of cases any reason for the Hurd outfit. I think it is a very good thing in a country practitioner's office, but it consumes more time and more gas. As far as the apparatus is concerned, it works successfully, but there is no reason for using the slow method when quickness is what is wanted. The busy dentist can make more money at other operations than to have the patient sitting in his chair for half an hour, when he wishes the time for other work of more importance to him. As far as fees go, it does not pay to be bothered with extraction, unless you are equipped for it and can allow the patients to sit around, until they feel they are able to leave in comfort.

INSTITUTE OF DENTAL PEDAGOGICS.

DISCUSSION OF DR. BROOMELL'S PAPER.

DR. WHITSLAR:

The author of this paper indicates that the manner of teaching this subject should not differ materially from that used in a medical college. The difference is in most cases the amount of embryology taught. It is not necessary to develop the whole anatomy in a dental course, but a general idea of the development of the various tissues is worthy of the time and effort. This is particularly true of the epithelial and connective tissue groups, although the nervous and muscular groups are quite necessary to consider in the relations of the evolution of the teeth, jaws, and face.

At this point I desire to make this general observation, that the teaching of embryology or any subject should be simple and consistent with the advancement of students. It is therefore expedient that we raise the standards of requirements of entrance to colleges so that subjects taught can be elaborated with the assurance that students will comprehend them. The versatility of the teacher, as well as his ingenuity, is often taxed in the presentation of the subject of embryology. The teaching of anatomy to make it interesting depends upon the teacher. Professor Broomell seems, however, to have solved the problem to a great extent, and met the needs of his classes and himself as a teacher. by providing a suitable and admirable text-book. If we refer to the text and illustrations of this book we can easily comprehend the value of the macroscopic study he outlines in his paper. Actual specimens demonstrated to the class in small sections give instruction that is not easily forgotten, and it also leads to a greater interest in microscopic work. While the laboratory work in general histology should precede the study of embryology, it is necessary to remind the students of the early development of the cell, its maturation and fertilization, then especially segmentation. We now elaborate the epiblast, mesoblast, and hypoblast. If these primitive layers and a general conception of their derivatives is fixed firmly, a basis for evolving the tissues of a tooth is established. For instance, we indicate that the enamel of a tooth is a derivative of the epiblast only. The epiblast lines the cavity of the mouth and becomes the Malphighian layer of the mucous membrane and from this the enamel organ is formed, which by means of the microscope and stereopticon is illustrated a wonderful picture. The processes of segmentation are in reality difficult to pursue, especially of the holoblastic type of segmentation, because of the scarcity of natural material, but the meroblastic type is easily studied with the hen's egg. I have often wished that we could spend some time, if the time allowed, to study successively the stages of the primal stages of the developing chick. This could be accomplished with the hen's egg during incubation. It would tend to advance microscopic work investigation.

Let me say, that I believe there is no such training in our curriculum preparatory to the dental work proper as microscopy. It trains the eye to see, the mind to think connectedly, and the hands to execute. Microscopic work should have a large place in the curriculum.

Now, Professor Broomell has indicated that the study of embryology should deal with the tooth development as well as the structures of the mouth walls. With this development we must remember that while an embryo is in an ordinary sense the vitalized germ before it reaches its distinctive form, in reality the term embryology is employed to cover the anatomy and physiology of the organism during the whole period embraced between the time of impregnation of the ovum and the complete development it attains in the adult. This, you will perceive, is undoubtedly true, especially in regard to the development of the teeth. Therefore, this course of study should include all the factors pertaining to the eruption of the teeth. This follows naturally after calcification of the teeth. Professor Pierce's chart of the calcification and decalcification of the teeth is of great value, and Dr. Broomell's illustrations of individual teeth upon the same subject are fine.

Dr. Broomell has kindly given us his methods of preparation of specimens as well as his enthusiasm, so it is safe to say that every member of this body will carry home the conviction that the course in embryology must have a larger amount of time and consideration given to it in the curriculum.

J. J. MACKENZIE, M.B., Toronto, Canada:

Dr. Broomell's presentation of this important subject has interested me exceedingly, and I regret very much that I cannot be present personally to congratulate him upon it.

There is little doubt in the minds of teachers nowadays as to the importance of a knowledge of embryology for the student of dentistry or medicine. It should form the groundwork for the intelligent appreciation of the facts of both minute and gross anatomy, and our understanding of pathological processes will be the clearer and broader the more we recognize the influence of embryological factors.

Dr. Broomell's position in regard to the necessity of emphasizing the macroscopic side of the teaching I thoroughly agree with; I believe that it is the experience of every teacher of histology and embryology that he insists more and more upon the study of objects with the naked eye and the lowest powers of the microscope, and if every student were made to provide himself with a good, simple pocket lens, or if each microscope box were provided with one as a part of its equipment, it would be found a very useful adjunct in teaching.

I take it that the author of the paper would not advocate the establishment of a course in embryology distinct from the department of microscopic anatomy, and in this I would agree with him; I personally have always found that the best introduction to the study of histology was a few lectures and demonstrations in general embryology, but there is no doubt that these few introductory lectures are not enough to devote to such an important subject, and the practical question which dental teachers have to face is, how much time can be spared from the already somewhat overloaded curriculum? For the solution of this difficulty I do not presume to offer any suggestions. as I feel that that should be left in the hands of those whose duty it is to arrange the whole curriculum of study. We who are engaged in the teaching of the preliminary subjects of the course are apt to find our departments looming too large in the field of our vision, and no doubt in the struggle after a more scientific groundwork of instruction in medicine and dentistry, it was well that this should be so, but now that this object has been attained, our duty is simply to point out the importance of the subject of embryology, and we may safely leave it to the combined good sense of the faculties to see that it receives its just recognition. I am, perhaps, dwelling a little longer than I should on this aspect of the question, but I feel very strongly that in a great many medical schools of this country we have an example of the way in which one subdivision of a subject has been developed to the detriment of the whole subject in the way in which the teaching of bacteriology has tended to crowd the teaching of general pathology.

I should advocate, therefore, the extension of the time devoted to the course in histology so that the embryological instruction could be included in it and possibly include in the course in comparative anatomy a short course in comparative embryology.

To return to the discussion of Dr. Broomell's paper, it seems to me that the question of the importance of age determination is somewhat overestimated by him; aside from its general developmental significance, I should not be inclined to dwell specially upon it.

In regard to his position in insisting upon a thorough study of the development of the face, there can be no two opinions; its bearing upon oral pathology, one might say, is evident on the face of it. In my own teaching of the development of the tooth, I have found Rose's models of the very greatest assistance, and it seems to me if we had the time to allow students to do a little of the "platten modelirung" for themselves, it would emphasize the value of the results of Rose's work for our knowledge of the developing tooth. It is possible that this might be accomplished by demonstrations to the class from good series of human embryos, followed by the distribution of mimeograph reproductions of drawings of the portions of sections to be modeled. By giving to groups of students definite portions of the face to model or definite parts of the mouth cavity, one could engage the whole class in the work. Instead of wax, modeling clay worked to a proper consistency and rolled to a thickness corresponding with the magnification of the drawings could be used.

It is not, perhaps, wise to criticize methods as outlined in such a paper as Dr. Broomell's, because the methods which give the best results in the hands of a given worker are those with which he is most familiar, but I would like to express my preference for the combination of Formol with the Müller's over the pure Müller as a fixative or a combination of sublimate with potassium bichromate, or even the ordinary aqueous 5 per cent to 10 per cent Formol. For distributing individual sections to the class, I prefer celloidin imbedding, since cut sections can be so easily stored, and there is no danger of destruction of the section if they are given to the class to stain and mount.

As a stain I prefer Hæmatoxylin, and in that modification known as Ehrlich's, staining fairly deeply and using the van Giesen method of counterstaining with picric acid and acid fuchsin; this method of staining I feel convinced is by far the best one we have for routine work, either in normal or pathological histology, giving, as it does, such a beautiful differentiation of all the elements of the section; but, as I suggested above, the good workman rises superior to his tools, and we have only to consider the truly wonderful results achieved in the old days of the simple hand razor or double knife to be again reminded that "it is the man behind the gun that does the work."

In closing, I wish again to offer my heartiest congratulations to the author of the paper for the able manner in which he has presented the claims of embryology for a place in the curriculum.

Dr. F. B. Noyes, Chicago:

Mr. President—The first question in my mind is as to the position of this study in the dental curriculum. Certain it is that there is no more difficult study to teach than this. I am of the opinion that the place for the consideration of this subject is not to serve as an introduction to general histology, because in order to appreciate and understand embryology the student must have the ability to recognize the different tissues. The student is in need of all his knowledge of the appearance of the tissues in order to interpret what is presented to him. He needs all the training and microscopic interpretation he can get in his course. For that reason I believe that all the general histology should be given in the first year; the dental histology in the first part of the second, and embryology at the close of the second year. At that time he has a thorough knowledge of the tissues in general, the teeth in particular, and he is ready to take up a subject which leads him further than any other in the entire dental course. I mean by that that embryology is the broadest, the deepest and most far-reaching study of them all.

Dr. Broomell says that the manner of teaching this subject to dental students at the present time should not differ from that in force in the medical schools. I cannot agree with him in that regard. The physician is more particularly concerned with the nutritive processes, as we see them in the embryo, than the dentist. The dental student is more especially interested in the manner of development of the individual as a record of the development of the type, and not with the nutritive processes of the embryo. I believe that we should discard all that we do not have to consider particularly in the dental course, such as the origin and growth of the various maternal membranes and other organs and structures which are developed for the nutrition of that parasitic creature during its parasitic stage. We are concerned with the development of the embryo itself and for that reason we can eliminate the most complicating part of the subject, that with which the medical student must be familiar.

The purely technical part of the paper calls for no discussion. So far as I know the course in dental histology in most dental institutions is practically a study of sections of developing teeth. I believe that that is of comparatively little value to the dental student, because in order to interpret them properly he must have a knowledge of general embryology. I take it that it is obviously impossible for the dental student to spend enough time upon embryology to follow the subject through a full course. It can be only an outline, beginning with the segmentation of the ovum and the formation of the various germ layers; then the heart, enteric tract and the other organs.

What, in my judgment, is required is that the instructor be very familiar with the subject; that he be able to eliminate the complications and present in a clear and concise manner the history of development, and I believe that that can be done better in the lecture-room, with demonstrations in chalk, lantern slide and clay, than we could ever hope to do in the laboratory. I would modify that to this extent. If it were possible to obtain sufficient material for the students to carry out the dissections which the essayist has suggested, and the time of the course were unlimited, I would be ready to admit the value of laboratory work.

The proper introduction to the study of embryology is a historical review of the development of our knowledge of the mechanism of cell life.

That opens before the student's mind the whole subject of heredity and transmission. It presents for his consideration an entirely new field, one that is extremely far-reaching in its effects and results. It leads to the definiteness of embryological development. The fact that the nucleus of the fertilized ovum controls the whole process, explains how it is that the enamel organ develops in the jaw; and the dental pulp develops under it. Not because the enamel organ makes the dental papilla develop, but because the material which controls the development of the dental papilla and the enamel organ cell has been sent there by the mechanism of cell division. That is the first idea which the student must have in the study of embryology; and then we must follow out the successive stages of development.

The best way to learn anything is to study it out for yourself, but at the same time this is also the slowest and most difficult method. I believe that a good teacher who knows his subject can give a clearer idea of development than the class could work out from original material in five times as much time. What the dental student wants is that clear idea of development without being obliged to go through all the work which would be required of him if we are going to make an original investigator out of him.

Just one word in regard to helps to teaching. I believe that there is no help to the teacher of embryology which can compare with the clay. Take a ball of clay and let it represent the ovum; then carry out the idea of segmentation on that ball of clay and you can show exactly how segmentation takes place; then you slowly develop the blastoderm, and from that go on to the modeling of the primitive groove and the primitive streak; the medullary plates; building them up bit by bit. Then take a knife and cut through that clay and project on the wall from lantern slides the cell structure of the blastoderm. In the same manner you may continue the building up of the embryo, showing the formation of the oral cavity, beginning with the development of the neural canal, the development of the brain vesicles; the formation of the face; the failure of union which causes cleft palate and all the other features of special interest to the dentist. It is in line with Dr. MacKenzie's statement that the wax models are of much use to him. In the technical procedures every man will have his own preferences.

Dr. H. B. Tileston, Louisville, Ky.:

I have been so busy filling the duties of the secretaryship that I have not had any opportunity to prepare any discussion on this subject. But, needless to say, I have been very much interested in Dr. Broomell's paper, and I believe that it is deserving of unstinted commendation. Embryology, although we must all admit its importance, has only a minor place in the minds of most dental teachers and also in the curricula of dental colleges. I have looked in vain in the catalogues of many institutions for even a mention of the fact that embryology is taught or that it is considered of sufficient importance to receive a place in the course of study. And, judging from the general exodus to-night, when this subject came up for discussion, I believe I am justified in saying that it is considered something entirely foreign to the teaching of dentistry. It is an interesting study to take up, and it can be made exceedingly interesting to the class by any one who is an investigator. I at one time was a teacher of embryology, although I never made any original investigations, having neither the time nor the inclination to take up this work, as I know that every teacher of embryology should. Of course Dr. Broomell has made a study of this subject, and he is capable of teaching it in a manner which would be entirely impossible to the great majority of practicing dentists. The subject is taught in a very desultory and unsatisfactory manner in most of our colleges. In teaching it I have never been able to follow the subject as closely as if I had been doing original work, but I always did the best I could from what I could gather from the writings and investigations of others.

The course is not mentioned in the curricula of dental colleges unless it is included under the heading of histology, as was suggested by Dr. Noyes. I believe that this subject should have the consideration at the hands of the dental profession that it deserves, and I am sorry that at the present time it has not a definite place on the curriculum.

Dr. G. V. Black, Chicago:

Although I had the pleasure of hearing the paper, yet I unfortunately missed much of the discussion thus far. Embryology is a subject of vital importance; a subject that we cannot do without; a subject that we cannot teach in full. When I had dissected and examined the human embryo in all its stages, practically, I obtained one of the greatest works on that subject I have ever known, one of the greatest that has ever been written (it was in the German language), and I found 300 pages of closely set small type, nearly a thousand words to the page, which considered the first three days of the development of the embryo of the chick. After I had waded through all that and thought that I comprehended it fairly well, I said to myself, "We can never teach this subject in any dental school." It can only be taught by the specialist in embryology; and yet, shall we for that reason give up teaching something of it? By no means. Pick out those fundamental things, those things which are of real importance to the dentist, and teach them, not only didactically in the lecture-room, but in the laboratory as well. We ought to do the best we can under the circumstances. It is not necessary, nor is it worth our while, to give all there is on the subject of embryology, but let us teach at least those things a knowledge of which is necessary to a proper understanding of the mechanism of life. We should also teach those things which go to make up the formed elements of the tissues and their development; we should teach along the lines of dental embryology. This we can do with profit to the student without going into the whole subject of embryology. There are some things that he should know, and it is for these that the subject of embryology should be included among the subjects embraced in the dental curriculum. It is altogether too important a subject to be omitted entirely, and it should be taught by a man who is thoroughly competent.

Dr. Wm. C. Barrett, Buffalo, N. Y.:

I understand that the subject under discussion is the teaching of dental embryology and not the study of that science. I do not understand that in our dental colleges it is advisable, or even desirable, to take up original investigation, because if we should attempt it we must take the time for it from other studies, which are much more essential to the dental student than is embryology.

I have for a considerable number of years been teaching dental embryology, and I have never cut a section before the class, nor have I ever asked my students to mount one. I teach that which has already been demonstrated and do not believe it essential practically to prove every proposition advanced. They must accept some things for granted.

All life is not from the egg. Parthenogenesis is the development of the asexual life. In Karyokinesis I commence with the fecundation of the ovum, and carry them through its segmentation and gastrulation, the formation of the several blastodermic layers, the progressive metamorphosis that takes place in the development of the embryo, until I finally reach that stage in which we note the appearance of organs. Then I trace the buddings of the various external parts of the body, the formation of the visceral arches and clefts, gradually leading up to the first formation of the so-called primitive dental groove and the dipping down of the various layers for the formation of the dental follicle. I trace the dental follicle through its development, give its history, and by means of the lantern throw upon the screen the prepared sections, illustrating all the various stages of the growth of the dental follicle. All this can be done without giving out a single section. I believe that it is a waste of energy to give the dental student a course in laboratory embryology, for the time at our disposal will permit only the teaching of a general, yet succinct, idea of the whole subject, without going into a detailed study of it.

That we shall rob other studies which are of more importance to the practicing dentist than embryology of some of the time allotted to them, is radically wrong. I am very glad that we have men in our profession who are willing and who can make original investigations in this subject, but that is not for the mere tyro. I do not believe it either advisable or desirable to teach original investigations, nor even to pursue them in the presence of the student; not because it is undesirable knowledge, but because there is not time enough in which to do this work without taking it from other more important studies. The student should not be compelled to do original work in this subject, but he should have the benefit of such work when it is conducted by his teacher.

Dr. Geo. W. Cook, Chicago:

I want to ask a question. In listening to the discussion on this paper, it is apparent that nearly all are agreed that embryology is one of the essential things in our curriculum. Now, I would like to ask those gentlemen who have been teaching embryology and histology, how much time should be devoted to the teaching of those subjects? Of course, the work can be done only by one who is familiar with these subjects and who has classified them for the dental student. While, as Dr. Barrett says, it is not necessary to teach the dental student how to carry on original investigations, yet I believe it is necessary that he should have a working knowledge of the subject if it is of any value to him. Now, just how much time should be devoted to these studies, and would they crowd the other studies in the curriculum?

Dr. Wm. C. Barrett, Buffalo, N. Y.:

A considerable portion of that which has been sketched out here, and which I have heard mentioned as the study of dental embryology, belongs to embryological histology, and not to the development of the ovum. The organization of the tissues is a part of histology and not embryology, the latter more especially relating to the development of organs.

Dr. F. B. Noyes, Chicago:

My course in embryology occupies about six weeks at the end of the term; one lecture hour and two laboratory hours weekly.

Dr. Fred C. Zapffe, Chicago:

When I was first appointed professor of histology in the dental department of the University of Illinois, I was confronted with the problem of occupying one hour a week with a lecture on histology before a class who had full credit for this subject. The two-year term in histology was then just being inaugurated and it became necessary for me to fill in this time with something which would be of service to the dental student. It occurred to me that a course in embryology would be not only interesting but valuable in pointing out the method of growth and development of the mouth, teeth, jaws and accessory cavities and parts, and also to take up the embryologic causes for the existence of cleft palate, hare-lip, and other deformities of the oral cavity. To my knowledge no other chair in the college was taking up this work, and I believed at that time that I was a pioneer in teaching embryology to the dental student.

I proceeded to outline my course of work in order to give what was essential to the dentist and yet to hold the interest of the class while I was leading up to that portion of the work. Embryology is essentially a laboratory study, and it is a study of a lifetime and not one of seven or eight months, of one hour a week in the lecture-room or a few hours a week in the laboratory. The peculiar nature of the work, the fact that it is a study in progression, prohibits its study on models, or charts, or even microscopic sections, unless they are serial sections. Again, embryology is a miscroscopic study, and the dental student has neither the time nor the training in microscopic work to go into it to any great extent. Even if it were possible to obtain animal embryos in sufficient quantity to supply each two or three students with a specimen, the rapidity of development in the animal embryo, the vast and important changes that take place in the space of a few hours, militate against the use of animal embryos in the study of embryology; at least, in the class-room or the laboratory of the college. So that when we come to look the ground over, we are forced to the conclusion that the effectiveness of a course in embryology is dependent entirely on the ability of the teacher and his wisdom in the choice of such parts as will be of value to the future dentist.

The teacher of embryology should of necessity be thoroughly versed in histology, pathology and bacteriology, so that he can dwell with sufficient emphasis on the relative importance of each stage in the development of a tissue or organ. His knowledge of embryology should be in consonance with his training in the other branches. And, withal, he must avoid overwhelming the student with a mass of facts which take the form of a meaningless jumble. The teacher of embryology should also have some imaginative power; he must be able to depict with the pencil or chalk what he is describing in words; he must have clearly outlined in his own mind just every step of the development of the embryo; what precedes and what follows, so that he can give the student clear and concise information. Judging from the remarks of the preceding speakers, we all appreciate the difficulty of teaching embryology when it is given at the same time with other work which naturally distracts the mind of the student. A course in embryology, to be complete, should be taken up by itself, followed continuously and thoroughly. Inasmuch as this cannot be done in the dental school, nor in the medical, we must search for the best we can do.

As I am a medical man and not a dentist, I was somewhat at a loss at first to choose just what would be of most service to the dental student. But I managed to get started, and one thing naturally followed another. I devote the last four months, or nearly so, of the junior year, to the teaching of embryology. I give a lecture course, one hour a week, for fourteen weeks. I begin with the fertilization of the ovum and continue with its segmentation, the development of the blastodermic layers, the neural canal. after the formation of the primitive streak and groove. I do not go into the detail of the formation of the genito-urinary nor the respiratory or gastro-intestinal tracts, except in so far as would pertain to the head and neck. I put in all my time on the consideration of the development of the various parts and structures of the head and neck, and especially the oral cavity and its parts and accessory cavities; giving this portion in full with the view of impressing firmly on the mind of the student the reason for malformations. I can complete this course in just fourteen solid lecture hours, excluding the quizzes, and many times I fail to hear the bell and talk more than an hour.

As accessories to teaching this work, I use my hands, my imagination and a good deal of chalk. I draw everything as I describe it; representing it from every side and in all its phases. so that the student cannot but follow me. I use colored crayons and spare no effort to make the work clear. In this way I can follow out the successive stages of growth in one drawing, and I am firmly convinced that my students get more out of it in that way than they would from charts, models, or even a laboratory course. Clay is also an excellent adjunct, but I fear that the students become more interested in the manipulation of the clay than in what you are trying to represent.

ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held February 10, 1903, at the Hotel Stratford, with the President, Dr. E. J. Perry, in the Chair.

Dr. A. W. Harlan read a paper entitled "Pulp Digestion."

Dr. J. W. Wassall:

Mr. President, I have had no experience in the use of digesting agents for devitalized pulps. I have heard Dr. Harlan on this subject before, and while it has seemed to me a good thing, and that I ought to use papain, I have always felt when I reasoned it out that I could not see enough advantage in it over the old method. I could not see any saving of time, nor could I see that the final results were any different. For instance, he insists that before papain is used the pulp should be entirely lifeless. He also insists that papain must remain in contact with the pulp for some four or five days, and that before it is applied the bulbous portion of the pulp should be removed. All those things require time. At least some few days or a week ought to elapse before the bulbous portion should be removed. I have never had more than the usual difficulty in removing pulps painlessly if I waited long enough. It is my custom to wait from ten days to a fortnight. In ordinary cases, the pulp by that time has separated from the living stump at the apex and comes away painlessly. There are perhaps a few cases with small, tortuous canals, where the papain may be used with advantage.

I have been backward in this matter, and after listening to the paper this evening, I am determined to get a supply of papain for trial. I am ready to be convinced, and if it has value I want to avail myself of it.

Dr. C. N. Johnson:

I cannot offer any suggestions in regard to this paper, but I would like to ask Dr. Harlan one or two questions. He mentioned two points, one of which was in regard to the fact that the pulp must be absolutely dead before papain will do its best work. I would like to ask him how long he would wait after the application of the arsenic before applying papain in ordinary cases?

He also mentioned encystment at the end of the root. I should like to ask him how long he considers it will be in ordinary cases before that encystment takes place? I would like to have him make a note of those two questions and answer them in closing the discussion.

Dr. W. V. B. Ames:

I would like to have Dr. Harlan tell us how near these preparations are permanent under ordinary conditions, and the vicissitudes of handling them in the office, exposure to air, etc., and also what he would expect, say, in a third molar in a proper condition, from the application of one of these ferments in the bulbous portion of the pulp chamber, and would one application eventually liquefy to the end of the root if left a sufficient time, and a sufficient quantity of material is used?

I tried papain a little at one time, but I do not think I did it very thoroughly. I did not follow it up, but I am inclined to make another trial.

Dr. J. P. Buckley:

I do not know that I have ever felt more embarrassment than I do to-night in being asked, as a young man in dentistry, to speak before these older and wiser heads.

The Odontological Society of Chicago has been very interesting to me ever since I began to read the papers that have emanated from its members. I appreciate the fact that from this society we have had some excellent papers, and among them I will mention the papers presented by Drs. Royce, Reed, Johnson, Woolley, and others. I have studied all of these papers and they have interested me very much.

The subject of materia medica and therapeutics is interesting to me because it is a great field. There is no question in my mind but what the general trend of therapeutics is changing and must change in medicine as well as in dentistry. If it is changing in medicine, it must necessarily change in dentistry. Empirical therapeutics is passing away and rational therapeutics is taking its place. Dentists are not satisfied in knowing that papain will digest a pulp; they are not satisfied to know that eucalyptol disinfects the cavity of a tooth, or that oil of cassia stains the structure of a tooth, but they want to know the constituents of these drugs that give them this peculiar property.

I have not tried papain, but after listening to Dr. Harlan's paper, I can see the true value of it; I can see more now regarding it than when Dr. Harlan introduced it a year or two ago to the profession.

There is something radically wrong, in my judgment, in the treatment of the anterior teeth where we devitalize living pulps if we stop to think of it and reason it out. You will pardon me for getting on to the subject of discoloration of the teeth, but I think I can see the application. You devitalize a pulp with arsenic, and make the pulp bleed. If you do not make it bleed, you counteract the action of the arsenic by flooding the cavity with dialyzed iron, which is a great antagonizer of arsenic; you seal in tannic acid, and then you attempt to remove the pulp in its entirety. This has been the general method all these years. I believe more teeth have been permanently stained by that method than by any other, because there is iron in the hemoglobin of the blood, there is blood in the pulp that has been devitalized; not only that, you put dialyzed iron in the cavity, you seal in the agent that has been known to be incompatible. Tannic acid in medicine is known to be incompatible with iron, and it is incompatible because it forms tannate of iron, a dark-brown substance. This stains the dentine and the tubuli of the dentine in such a manner that it is one of the hardest things to bleach we have.

I can see the value of papain, as I have said, as a digester of pulps, because you can devitalize the pulp, you can seal in the papain, digest the pulp and remove it in its entirety, i. e., you can wash it out and remove it completely. By adopting this method you will not stain the dentine of the tooth.

I do not know of any greater field in dentistry where we can get more true satisfaction and study in reasoning out these things than in dental therapeutics. It is a field in which we are all very lame, and we are indebted to Dr. Harlan for the work he has given us in the past, and the manner in which he continues to work in bringing out these results like he has to-night. I cannot discuss the paper or subject, because I do not feel like talking to men who know much more than I do about it. However, I want to say that I feel highly honored in being asked to be a guest of your society.

Dr. J. H. Woolley:

The essayist has given us a paper of much practical value. He has shown us in the use of papain that it will digest, to liquefaction, the pulp and all other matter of like nature remaining in the canal. Instrumentation has not shown such reliable results; and we are not sure that we can remove by such means all of the dead pulp which may be remaining in the canal. After pulp digestion takes place the canal can be flushed, until it is rendered free of all foreign substances. Care should be used in sealing the cavity when papain is placed in the tooth, in order that there may be no pressure, and consequent irritation. In neglecting this many fail in reaching the desired results. Failure is due, not to the nature of the remedy, but to its mal-administration.

Dr. J. E. Hinkins:

I do not know very much about pulp digestion except what I have learned from Dr. Harlan when he read his paper two years ago in Paris. At that time he gave me a bottle of papain, and I used it with good results. Since then I have been using it more and more, washing out the cavity with hydrochloric acid preparatory to using papain as he has directed. I have not used it as extensively as I might have done, but in the cases in which I have used it where the pulps were dead, the results have been very gratifying indeed. I have had very little pericementitis or inflammation in the cases in which I have used it, practically none at all, and I am using it more and more.

Dr. J. G. Reid:

I have used papain occasionally since 1900, and I have not made up my mind at present whether it is a time-saver or not. Perhaps I may be at fault in this because I do not use it frequently enough. I have had some trouble with it, but I do not know whether it is due to faulty manipulation or not. I have had apparently some trouble that did not occur when I treated my cases by other methods. This may not be the fault of the agent. An agent that is so harmless as papain would seem to be ought not to cause any irritation or any unpleasant results. I apprehend that possibly the trouble from its use has been due, perhaps, to my manipulation of it, and yet I believe that I have used it intelligently and in some cases have seen excellent effects from its use. I believe that this agent does what is claimed for it. Dr. Wassall rather anticipated my thoughts in his remarks as to whether it is a time-saver or not. Yet I believe if I were to use it more in my practice, I would find that it was a timesaver. I must confess, however, that I have not used this agent sufficiently often clinically to give an opinion in regard to it. After arsenic has been applied to a tooth, it is my custom to allow it to remain in contact with the pulp of the tooth anywhere from four to six or seven days. I do not take it out in two days. We know that the pulp of a tooth in that length of time is devitalized, and any sensitiveness that arises after it has been in contact with an agent so caustic as arsenic for that time, is due not as much to the actual contents of the canal as it is to the union with some of the undevitalized pulp or nerves, if I may so express it. It requires some little time for separation to take place between the dead and the living tissue, and in meddling with a tooth earlier than that period which is required to separate it by natural processes, it may cause more or less pain in handling it. This cannot be avoided, and that explains to my mind more clearly than anything else why pain occurs from meddling with devitalized pulps before it is time. I think that in using papain the arsenic should remain in contact with the pulp several days. at any rate longer than is ordinarily regarded by the average dentist, and then the application of papain will do what is intended to be done, namely, digest the pulp. I am satisfied that it is a good agent to have in the cabinet, and I have had it in mine since 1900. To give a rough estimate, I have used it a hundred times in two years and a half. I expect to use it a great many more hundred times before I can give any reliable clinical data in regard to it.

DR. E. J. PERRY:

We have listened this evening to what I regard as not only a scientific paper, but one of great value to us all. A great many scientific things have been said in this society from time to time by Dr. Harlan, and whenever he gives us a contribution of this nature, it is always worth listening to.

I can see the extreme desirability of liquefying the contents of the roots of devitalized teeth. About twenty-eight years ago I applied arsenic to a man's tooth for the purpose of devitalizing it, and told him to come to my office at the end of forty-eight hours and I would take the arsenic out and put in a temporary stopping of gutta-percha. I did not see him for six months, he in the meantime having gone to California. When he returned

I supposed he had had lots of trouble. I took the gutta-percha stopping out of the tooth, removed the arsenic along with the pulp, and it all came out beautifully in one piece. At the apex of the root it was all white and of sufficient tenacity to stick together. I knew in that case that I had removed all of the pulp. We have all had that feeling. From that time to this I have not been in a hurry about removing pulps. I do not believe any dentist can extract a pulp from a molar or bicuspid in a recent state and know that he has removed it all. He is almost sure to leave some of the pulp in the apex of the root. Of course, one can remove all of the particles of pulp from any of the six anterior teeth, but in these flat canals the extreme desirability of liquefying the dead tissue should be evident to any man.

I want to thank Dr. Harlan from the depth of my heart for emphasizing this subjectand bringing before us this valuable agent. Some great physician has said that when he wanted any scientific proof impressed upon his fellows, he had to bring it before them a score of times before they would heed it. How long was it before Bonwill was listened to concerning the anatomical arrangement of artificial teeth, or how long was it before the dental profession confirmed other things which he discovered in relation to the human jaws, the arrangement of the teeth, the principles underlying the science of mastication, etc.? If Dr. Harlan's clinical and scientific observations are correct and his conclusions are sound (and they are, in my opinion), I believe that papain will be as universally used as arsenic itself.

Dr. Harlan (closing the discussion):

If you will look in the National Dispensatory, the United States Dispensatory, Cushny's Materia Medica and Therapeutics, Murrell's Materia Medica and Therapeutics, Brunton's, H. C. Wood's, Farquharson's, Biddle's, also the article on "Fermentation and Putrefaction" in Morley and Muir's Dictionary of Chemistry, and other recent works, you will find something in regard to paw paw and papain. Bouchut and Wurtz were among the first to isolate papain, and did so as early as 1877. There are a number of others who have written upon papain and its uses for digesting diphtheritic membrane; also its use in the stomach to assist in the digestion of various articles of food that are taken into the stomach. Others have used it for the digestion of dead tissue which adheres to suppurating surfaces in various portions of the body. But my own particular attention was not called to the use of papain until a fellow class-mate and friend (Dr. Wm. Van Antwerp, of Mount Sterling, Ky.) read a paper concerning the digestion of a piece of beefsteak that had been wrapped in paw paw leaves while he was driving two or three miles in the country. From that time to the present I have had something to do with paw paw and papain in connection with pulp digestion. In the paper I read in St. Louis, I gave something of the history of paw paw and papain, which will be published shortly in The Dental Review.

Papain was not a merchandizable product in 1881, and the first use I ever made of paw paw juice was from the green extract prepared by Wm. S. Merrill & Company, of Cincinnati, which was not satisfactory. Later I was able to obtain papain that was isolated by Merck. There are other manufacturers who have isolated it, and among them I may mention Lehn and Finck, and Johnson and Johnson, and the American Ferment Company.

With reference to the questions that have been asked, Dr. Wassall says that he does not see any particular necessity for its use; that he is able to remove the pulps of teeth that have been destroyed under certain circumstances within a certain time. I am willing to agree to that in certain respects, and if anyone will read the papers I have already published, he will see that I have recommended it for the digestion of pulp tissue in small, tortuous, thin and flat roots, where it is more or less difficult to remove the pulp. I do not recommend you or anybody else to digest a pulp in a central incisor, a lateral incisor, or a cuspid, unless there should be some difficulty in removing it with an instrument. Under those circumstances, I prefer to liquefy the pulp.

In answer to the question of Dr. Johnson, I prefer to mix the paste, or make the dressing without using one that stands in the case. I take a fresh, clean glass slab, and, as was my custom in the beginning, I take one grain of papain, and one drop of Price's glycerine, which is free from organic acids, and one drop of 1-200 solution of hydrochloric acid, and mix them together into a paste. If a patient comes in with a tooth that is aching, and the pulp is exposed, I always try to stop the toothache before making any application. The arsenic which is applied to the pulp of the tooth is composed of ninety grains of arsenic, forty of the crystals of hydrochlorate of cocaine, and a sufficient quantity of lanolin to make the paste. This is applied directly to the pulp when I am ready to destroy it. If it is a tooth whose pulp is exposed, it is applied to the dentine and sealed therein. If it is directly exposed, I leave the application for seventy-two, ninety-six, or a hundred and twenty hours, as long as is convenient, until the pulp is destroyed. If it is a case where the dentine only is exposed, I may leave it a week or ten days, so that at the end of that time the pulp will be destroyed. When the patient comes back, I remove the dressing by adjusting the rubber dam, to avoid contamination. I puncture the pulp, and cut away the bulbous portion with a spoon, a knife, or some suitable instrument, and I make this paste I have spoken of, apply it directly to the remains of the pulp, and cover it over with a piece of paper fiber soaked in dead-white liquid vaseline. I then cover that over with oxychloride of zinc or gutta-percha. I take eucalyptol and wipe it all around the margins to see it is thoroughly sealed; I let the patient go away, and I do not have any fear or trouble. I can let them go three or four weeks, because this will not stain the tooth. If the pulp is dead. there will be no pain, and the patient can go about his business. The substance of the pulp of a tooth can be digested in four days, if there is not too much material, or it can be so liquefied that it will be easy to remove it without any trouble. But it would be much easier, as I said in my preliminary remarks, if you can apply the agent to the whole length of the pulp in a tooth, but you cannot do it; therefore, I re-apply it at the end of three or four days. I would not have a patient come to the office expressly for that purpose; I would leave it for a week, if necessary.

Dr. Ames:

You mentioned leaving a vent-hole.

Dr. Harlan:

That was with reference to a pulp that is already dead, and putrescent. I would leave a vent-hole in the gutta-percha or in whatever I covered it over with.

Dr. Ames:

To what extent can you use germicides with advantage along with papain?

Dr. Harlan:

You do not need them. Dr. Buckley will bear me out in this. that all vegetable pepsins have the property of attacking albuminoid substances. They attack first the fibrin, and after that decomposition takes place, as the result of the conversion of them into a liquid, and that is true of trypsin, pepsin, papain, mucin, and half a dozen other vegetable ferments, and you do not need to use boric acid, carbolic acid, or bichloride of mercury in connection, if you are going to disintegrate, to digest, or to liquefy a putrescent pulp, one that is dead and being decomposed through the agency of micro-organisms in the tooth.

Dr. Wassall:

What is the need of using a digestive agent if a pulp is undergoing putrefaction? The contents are already practically in a liquefied state. Usually a pulp that is undergoing putrefaction is more or less decomposed, and it is difficult to find fibrous tissue.

Dr. Harlan:

It is only the bulbous portion. I am speaking of this in a general way, while you (referring to Dr. Wassall) are speaking of it specifically. We will stick to a putrefying pulp. Dr. Wassall knows very well, although he has taken me off the subject a little. that patients come to the dentist sometimes with a filling in the root, and the pulp is dead, and the gases of decomposition are already pent up and a portion of the pulp may be decomposed. He drills into the tooth, opens it, and sometimes there is great irritation and inflammation around the apex of the root and the pericementum. If you open into that tooth, and take an instrument, no matter how carefully you may work, as a rule, you will set up a destructive inflammation and cause great disturbance around the apex of the root, and, in fact, promote an abscess. Since the publication of a joint article on the management of pulpless teeth, written by Dr. Cushing, Dr. Wassall, and myself. there has not been anything new in particular directed to this subject, which would oppose the plan adopted at that time. If you can apply an agent that will digest a pulp, avoid the necessity of using an instrument in forcing it up into the root, and running no risk of forcing any gases or fluids, or creating any mechanical disturbance beyond the apex of the root, you are a gainer thereby.

as well as the patient. I do not say you have to do it, but there are many instances where you can digest a putrescent pulp.

In the consideration of this subject, we must remember that there are many sides to it. Dr. Wassall may look at one aspect of it, Dr. Johnson another, and Dr. Ames still another, and we must take them all together. There are some cases where perhaps I would open into a tooth that contained the remains of a putrescent pulp, and I would not think of using papain where there is nothing to digest. I speak of this because there may be a portion of the pulp and of the root of the tooth which it might be hazardous to remove at the moment of opening into it, whether covered by a filling, or one that is already exposed. It is possible to digest the portion of the pulp still remaining in twenty-four hours, but in doing so I cover the agent with oxyphosphate of zinc, gutta-percha, or something else. If the pulp were dead, I would remove a certain portion of it, and bathe it with dilute hydrochloric acid solution. You can apply the paste, cover it up, allow the patient to go about his business, and when he comes back at the end of a week, ten days, or two weeks, you can remove it. I have had them go over five weeks, when the remains of the pulp were so completely liquefied or rendered so much smaller by the digestive process, that you could wash them out frequently by simply applying a little peroxide of hydrogen, without using an instrument. I removed a pulp the other day from a lower first bicuspid tooth, which I had destroyed previously by leaving arsenic in it for five days. I applied papain paste, sealed it, allowed it to remain for five days, and when I put the rubber dam on and removed the outer dressing, I was able to wash out the remains of the pulp with peroxide of hydrogen. I simply took a common pair of pliers or gold pliers, took hold of the skeleton of the pulp, and removed it without any trouble from one end to the other. The pulp was reduced very materially in size; it was not completely digested, but so much of it was digested that it was possible to remove it.

I am not making any plea for the general use of papain for the extraction of pulps. The plea I make is that there are many tortuous. small, thin and flat-root canals in inaccessible teeth. where it is almost impossible, even though the pulp is dead, to introduce a suitable instrument for its removal, on account of the pain it causes, and this fragment may be digested completely with papain.

I had a man in my office to-day who came from Montana. A dentist had driven a wooden stick in the pulp of his cuspid tooth, and he had always had more or less trouble with it. I do not think he could have taken it all out, and I told him that the only way to do was to bore into it and find out. I bored into it, removed the root filling, and when I got to within one-sixteenth of an inch of the apex, I found a remnant of the pulp. I introduced a fine broach, and removed it. I apprehend that in many cases, where there is constriction of the root, or when the root canals are curved, remnants of pulp remain there. When there are such constrictions, flattenings, or twisted ends of roots, if you can apply a digestive agent which is recognized in general medicine for its usefulness, in many cases you have an ideal method of removing pieces of pulp which it is extremely difficult to remove by any process, and I think it is far better than any mummifying process with which I am familiar. There is no analogy, either in natural history or in science, that I know of which can be likened to that of mummifying something which is surrounded by living matter. You can mummify a dead man by soaking him in oils, pomades, and wrapping him up in cinnamon and cloths soaked in peppermint, etc., but when you talk about mummifying a pulp which is surrounded by living animal matter, and destroy it by placing thymol, bichloride of mercury, and other substances in there, you still have the open end of the root of that tooth; you have got a living attachment of cementum around the dentine of that tooth that contains the so-called mummy. Is that going to last forever? Pulps of teeth die sometimes after oxychloride of zinc has been applied to cap the pulp, and there is a certain degree of inflammation that arises in consequence of the primary irritation at the apex of the root that finally causes the pulp to die, and after it dies, in consequence of the so-called mummifying action of the chloride of zinc and its chemical properties of disinfection, not its bactericidal, there is an encystment that takes place at the apex of the root. This will not last forever; sometimes it will last for two or three years. Dr. Black has stated that when the osteoclasts begin to multiply or get lively in that region, they are liable to tear down that encystment. It may be, they will tear down a part of the pericementum and cementum. He has shown excavations in the cementum brought about by the osteoclasts which are destroyers of growths that take place on the cementum and underneath the pericementum and around the apex of the root. In my paper I said it was necessary to remove the pulps of all teeth except those in which there was already encystment, or where the pulp was converted into spurious dentine. I used the word spurious instead of any other term. As soon as the pulp of a tooth has been digested and you have gotten the root of the tooth dry, you can remove it. I filled a cavity to-day, after having digested the pulp of the tooth about the middle of last December. I put papain paste into that tooth, sealed it with gutta-percha, and it has been free from pain from that day to this. The patient came in to-day, I applied the rubber dam, took out the papain paste, and the roots were absolutely empty. I took a fine broach, went down to the end of the root, felt the root, and it did not cause any pain. You know that many of the roots of molar teeth, especially second molars, are thin and flat, and it is difficult to remove the pulps from such teeth. When you have a distal cavity, you must cut down through the crown of the tooth, cut away a large portion of it, and I cut a considerable portion of this away, but there was an absolute absence of any pulp tissue. The pulp had been completely digested. I recall the case of a feeble-minded individual, for whom I destroyed the pulps of five teeth. I digested all of them; they were completely liquefied. I have had a large experience in this work. I have never seen cases where there was any discoloration. I have seen cases, however, where pain was produced. The only way I can account for pain is where one has applied it when the pulp is not dead. I said in my paper the reason why arsenic did not destroy the pulps of teeth many times was because it was improperly applied, and it was not left long enough. I say that again. Where it is impossible to quickly and thoroughly remove the pulp of a tooth, it is preferable to use some agent of this kind to digest the pulp, get rid of it in that way, and not run the risk of any stain.

This is a large field in the practice of dentistry, much larger than any man at the table may realize, because if there were no need for it, you would not be crying out for painless methods for removing the pulps of teeth if they could be satisfactorily removed with arsenic. But they cannot be satisfactorily removed with arsenic. They cannot be satisfactorily removed by nitrous oxide or chloroform anæsthesia in all teeth. You can do it in some teeth.

I feel that the importance of this subject demands that dentists should investigate it and see whether there is anything in it more than I have said. One thing I insist upon, that is, that pulps of teeth must be removed in order to preserve the roots for a lifetime.

IN MEMORIAM.

DR. W. C. BARRETT.

WHEREAS, In the fulness of time, having lived nearly the allotted three score years and ten, our friend and associate, William Carey Barrett, departed this life on August 22, 1903. Death is the anticipated end of man, and we rejoice that our beloved brother sleeps the sleep that knows no waking, in the full consciousness that he had performed all the duties of life in a manner that we, his associates, may strive to emulate. May his spirit rest in peace. Therefore, be it,

RESOLVED, That the members of the Odontological Society of Chicago, in full meeting assembled, testify their belief in the upright character, and devotion to principles of their brother, W. C. Barrett, and they one and all mourn his sudden taking off. This society tenders to his family and friends their sincere condolence, and it is ordered that a page be set apart in their record book to permanently preserve this note for all time.

RESOLVED, That a copy be sent to the leading dental journals for publication and one to the widow of our friend.

A. W. HARLAN,
TRUMAN W. BROPHY,
JOSEPH W. WASSALL,
Committee.

THE SOUVENIR MEDAL OF THE FOURTH INTERNATIONAL DENTAL CONGRESS.

A souvenir medal has been authorized by the Committee of Organization commemorative of the Fourth International Dental Congress, to be held next year in St. Louis, Missouri, August 29th to September 3d, inclusive.

The figure upon the obverse side—that of St. Apollonia, which has been selected to typify dentistry—is one which not only serves the symbolic end, but one which lends itself particularly well to artistic treatment. The design is an artistic representation which has both merit and beauty.

The symbolism of the reverse of the medal has been given ample consideration, and it is such as should meet with general approval. The universality and international character of the Congress movement is typified by the continental divisions of the world. The associated dates at the top of the design are those which embrace the professional life-history of dentistry. Falling gracefully down between the continents is a scroll upon which is to be inscribed the names of the recognized fathers of dentistry in all countries, each national body being asked to nominate the name or names to represent the respective countries. The pose of the eagle represents the auspices under which the Congress is to be held, and the palm branch a tribute of honor on behalf of the American profession to the fathers of dentistry.

The execution of the dies will be entrusted to the most expert die-sinker in America. The design will be in high relief, and the medal will be struck in bronze, and will be about two and one-half inches in diameter. It will be a finished work of art in all respects, and an attractive and interesting souvenir of the great meeting which it typifies.

The medal will be supplied only to those who make application for it in advance of the Congress, as the number struck will be limited to the number subscribed for. The price of the medal without a case has been fixed at five dollars. Cases for the medal will be furnished at prices corresponding with their character and quality.

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EDITORIAL.

THE INTERNATIONAL DENTAL FEDERATION AND THE FOURTH INTERNATIONAL DENTAL CONGRESS.

The officers of the International Dental Federation have sent the following communication to the Presidents of all the national dental societies in the world. The importance of the work of the Federation is sufficient to commend it to the attention of every thoughtful dentist, and we trust that the profession generally will awaken to the possibilities of this organization in its bearing on the future of dentistry the world over. It has undertaken a work which if successfully carried out will broaden dentistry and lead to a more rapid and uniform advancement than the profession has ever known:

"F. D. I."

INTERNATIONAL DENTAL FEDERATION.

(International Grouping of Dental Interests.)

(Circular to the Presidents of National Dental Societies.)

OFFICE OF THE SECRETARY-GENERAL,
45 RUE DE LA TOUR D'AUVERGNE,
PARIS, September 18, 1903.

Dear Sir and Honored Confrère—The International Dental Federation at its meeting held in Stockholm in August, 1902, in accordance with the powers that had been conferred upon it, decided that the Fourth International Dental Congress be held at St. Louis, Missouri, in August, 1904, at the time of the holding of the St. Louis Universal Exposition. The decision thus reached followed the receipt of invitations regularly addressed to the F. D. I. by the National Dental Association, the Odontological Society of St. Joseph, the National Association of Dental Examiners, the Odontographic Society of Missouri and Western Kansas, the Society of Dental Science of St. Louis, the Committee appointed by the Missouri State Dental Association, the Dental Society of St. Louis, the City of St. Louis, the Government of the State of Missouri, and the authorities of the Louisiana Purchase Exposition. This decision was confirmed at the session of the F. D. I. held in Madrid in April, 1903.

The officers of the Executive Council of the F. D. I., in accord with the authorities of the Exposition and the Committee of Organization of the Congress, have determined the conditions under which the Federation will take part in the organization of said Congress, and we are now officially advised that the Fourth International Dental Congress will be held in the city of St. Louis in 1904, from August 29th to September 3d, inclusive.

The purpose of this circular is to inform you that the International Dental Federation has decided to lend its entire support to the organizers of the Fourth International Dental Congress, and, in view of assuring the perfect success of the Congress, we therefore request you to appeal to the several dental societies in your country to take part in the said Fourth International Dental Congress.

It seems unnecessary to call your attention to the importance of all dental societies the world over being appropriately represented at this gathering, both scientifically and professionally. We think it, however, desirable to call attention to matters which the delegates of the different federations and national societies will be called upon to discuss with reference to the organization of the second term of the International Dental Federation—that which will be comprised, namely, in the period between the fourth and the fifth international dental congresses.

During the first working period of the F. D. I., comprised between the Third International Dental Congress held in Paris in 1900 and that of St. Louis to be held in 1904, the members of the Executive Council of the F. D. I. who were appointed in Paris by your representatives have fulfilled to the best of their abilities the mission with which they had been entrusted by the members of the Third International Dental Congress, of which you may have been able to judge from perusal of the printed transactions of its different meetings.

They have assured the holding of a Fourth International Dental Congress (resolution No. 13).

They have created an International Commission of Education, which presented a program of International dental education at the sessions held in London, Cambridge, Stockholm, and Madrid (resolution No. 16).

The International Commission of Dental Hygiene, organized at the Cambridge session, will at the St. Louis meeting complete the program of international dental hygiene to be recommended to the public authorities.

Other projects of interest to the evolution of dentistry—such, for instance, as the publication of an international dental review—are being carefully studied in view of future realization. Reports have been prepared and presented on the federation of schools; and other propositions are now under consideration, such as the creation of a universal nomenclature, and also of a code of ethics to be universally accepted. The execution of these projects will fall on our successors in the subsequent terms of the F. D. I.

It will be the duty of the delegates to the St. Louis Congress to ratify the constitution of the F. D. I., to introduce such amendments as may be necessary, to appoint the members that will represent the different countries in the Executive Council, and to decide on the program of the second period of the F. D. I.

Appreciating the importance of the great international gathering to be held in St. Louis in August, 1904, we are convinced that you will be able to induce the national dental association and the other dental societies of your country to take part in the Congress by sending delegates and by contributing scientific papers.

We request that this circular be published in all the dental journals of your country.

Please accept, dear sir and confrère, the assurances of our fraternal sentiments.

Dr. Ch. Godon, President.
Dr. E. Sauvez, Secretary-General.

THE EDITOR'S DESK.

The Truth.

I received a letter the other day that set me thinking. It came from a man whom I should like to help, and if he did not live in a distant state I should go to see him and talk to him. The purport of his letter was something like this: It seems that some one had published a paper in a dental journal taking him to task for advocating certain methods of practice, and his object in writing me was to get suggestions as to his reply. He paid me the compliment of virtually asking me to write the reply for him, and ended his letter in this way: "I know your ideas and mine agree on this point, and you can put it so much better than I can. I am determined to down this man, and hope you can help me out."

Well!! I suppose if it had not been for one expression in that letter I should have sat myself down some night when everybody else was in bed, and ground out something for him to incorporate in his paper. I have done even more foolish things than that in the past, and I have no confidence that I am growing less foolish as the years advance. But this friend of mine, whom I do not remember ever having seen, killed the goose that perchance might have laid him the golden egg when he said he wanted to use my argument to "down" somebody. That gave me an index to his sole motive in publishing a reply, and I stopped and thought.

I wondered how many men there are in the profession who write papers with this as the chief mainspring of their purpose—to achieve a personal triumph through the medium of pulling someone else down. It is appalling when you think of it, that men have no higher motive than this to go into print. What a marvelous difference there would be in our literature if men sought only to bring out the truth of things irrespective of personal bias or personal ambition.

And after all, truth is the only thing worth while. A victory with words amounts to naught unless it will stand the crucible of fact. The most skillfully twisted phrase that ever was framed by the expert manipulator of words is as tinkling brass unless it is based upon the fundamentals of truth. Nothing really lives but truth, and men delude themselves when they bend their meeting at the "Chelsea," in West 23d Street. About fifty sat down to dinner at 6:30. At 8 o'clock, after the dinner, the session opened with "Incidents of Office Practice." Two gentlemen presented cases of irregularity, and some little discussion was elicited.

Dr. Robert T. Moffatt, of Boston, read a paper entitled "The Art of Carving and Baking Porcelain Teeth and Crowns." He gave an exhaustive account of such work from our first knowledge of it.

In the afternoon, at a clinic held at Dr. C. O. Kimball's office. Dr. Moffatt had demonstrated his methods, and especially the value of carving single teeth, and closely imitating the natural adjoining ones, which could not be done with "store teeth."

In the discussion, Dr. C. S. Stockton seemed to disagree with the essayist as to the value of such work. Dr. Stockton said it was too fast an age. It reminded him of the old song—"Backward, turn backward, oh! Time, in thy flight"—spoke of days of yore when he did just such work. Said it was not of much value now, in "modern times," thus opposing Dr. Moffatt's ideas. After quite a discussion, participated in by Dr. J. Bond Littig and others, Dr. Moffatt, in answering especially Dr. Stockton, claimed that such artistic work was good work and would bring its own financial reward.

Following this a case of necrosis was reported, and the question of whether one should make a change when attending patients of a brother dentist, temporarily absent, was discussed—the majority in favor thereof.

Next to resume society activity was Brooklyn. The October meeting of the Second District was held in the rooms of the Kings County Medical Society, 1313 Bedford Ave., Borough of Brooklyn, Monday evening, October 12th. This being the first meeting since election of officers, the President's address and reports of various officers occupied much time. President Hamlet in his address strove to encourage the young men, spoke of the difficulty of getting good men from a distance and advocated bringing out their own talent. The program for this evening had evidently been so arranged, as two of their own members gave short, pithy essays. This meeting, and the Odontological, were the two best of the October meetings, largely because of the fact that it was home talent which "appeared."

The first paper was on "Ideal Anchorages for Gold Contouring in Incisors," by Dr. J. H. Hanning. It was very brief, but concisely stated his method of dovetailing into the palatal surface of enamel. In the discussion which followed a large number participated. Some in favor of a pit or groove near the cutting edge, some in favor of a deep seat, depending on that alone, and but few agreeing with Dr. Hanning. He had the courage of his convictions. It would seem to us that his dovetail anchorage about midway between the gum margin and the cutting or incisive edge, would be surer and stronger than a pit or groove or right angle just within the border of the incisive portion could possibly be.

The second paper was by Dr. P. B. Engel on "Some Causes for the Discoloration of Gold Fillings in the Mouth." This also provoked a lively discussion, in which many participated, notably Drs. Ottolengui and Jarvie. There seemed to be some difficulty in keeping to the subject—so many wanted to bring in porcelain work. Dr. Engel thought he had solved the problem, in the action of certain well-known tooth powders which certainly do affect pure gold, as was shown by experiments. Dr. Ottolengui thought there was much less of it now because much more care was taken at present by the manufacturers than formerly. In this Dr. Jarvie concurred. Dr. Ash described a case in which he had thrice removed the gold filling and refilled, to have it each time turn a copper color. This was in an upper cuspid. Finally he devitalized the tooth and again filled and this time had no discoloration. No definite results were reached, however, in the discussion.

The meeting was well attended and augurs favorably for the success of this society this winter.

The regular meeting of this "old stand by" of the dental profession, the First District, occurred October 13th, at the Academy of Medicine, 17 West 43d Street.

There were several reports of committees, and then the new President, Henry D. Hatch, made his address, which was a valuable one. He emphasized the fact that the dental societies of this state (New York), which are called "district" societies, corresponding to the Congressional Districts, are the only legal societies in this: they elect delegates to the State Society, which enacts all the laws, etc. The other societies have no representation in the State Society. By reason of this he pleaded for a larger attendance and greater interest.

The essayist of the evening, Dr. Genese, of Baltimore, failed to appear, and as he had not sent his paper, the meeting became a kind of "conversazione." Dr. R. M. Sanger described his method of using diatonic teeth for bridges.

Dr. Leggett described his method of using vulcanite work on bridges for the six fronts, a method of using wire in a large cavity, especially a corner, fastened with cement, to hold in position. A porcelain tip was described.

The death of Dr. F. M. Odell was announced. He was one of the early secretaries of the First District, and the father-in-law of Dr. Meyer L. Rhein.

The Central Dental Association of Northern New Jersey held its first fall meeting for 1903 on Monday evening, October 19th, at its former meeting place, Davis' dining rooms, on Broad Street, Newark. A goodly number sat down to the fine dinner spread by "mine host" Davis at 7 o'clock. After the dinner, the meeting was regularly opened, with the President, Dr. W. H. Pruden, of Paterson, in the chair. As with the other societies, much—very much—time was occupied with the usual routine business. The question of publishing the proceedings, and where, occupied a considerable portion of the evening, so that but little time was left to hear Dr. Oscar Gurbert, of Orange, who read a paper descriptive of dentistry in various foreign countries in which he had lived—especially in Germany and Russia. It was not a paper which could be the subject of much discussion, but it was interesting in showing the differences in practice between America and foreign countries. It is always interesting and profitable to attend this society's meetings. Its members are so loyal, and come from such distances to attend its meetings, that the spirit of comradeship is well shown. Some come such distances that they must remain over night. This society has become a great power among dentists and dental societies all over the country—and politically. We expect good meetings with them this winter.

Last, but not least, of our local societies to "hold forth" this month was the Odontological, and at the same old stand, the Academy of Medicine, on 43d Street. Dr. Hodson returned from abroad just in time to preside. At these opening meetings of the season things do not seem to be moving smoothly, for upon this occasion the "essayist of the evening" disappointed; but there was sufficient business and incidents of practice to hold the attention of the good gathering which was in attendance, and really I feel quite certain that if there could be instituted more of these "heart to heart" talks, an element which rarely attends the meetings might be induced to "come out."

Dr. Jarvie, of Brooklyn, cited an accident wherein a boy hit in the mouth with a football had the alveolar process fractured about the central and lateral incisors of one side, so that they and the process might have been removed by the fingers.

After a few days of neglect and with pus exuding freely from the tissue surrounding, the boy put in his appearance.

Dr. Jarvie recognized that an operation removing the sequestrum was the only feasible procedure, so that was done, being careful to retain the teeth in position. The case is doing well, bone tissue is being re-formed, and he feels certain from experience with somewhat similar cases that the operation will prove successful.

Dr. Rhein felt that he had something to present that would interest the society, in the nature of a new device for illuminating the mouth and room when it becomes necessary to operate after dusk, these short days. Being unable to describe the same understandingly, he invited the society to set aside an hour to visit his office for practical exhibition of the light, which invitation was accepted.

Other incidents of office practice were shown in the exhibition by the President, Dr. Hodson, of an improvement on Johnson & Johnson's cotton root canal points, which consisted in cutting the same obliquely—almost from end to end—which resulted in two cotton points with a sharp end on each. He also described and demonstrated his method of shaping steel matrices by means of a case-hardened, round-end punch, hammer and lead block. He showed that matrices can and should be made contoured to fit the same beautifully, and almost absolutely restores contour without wedging.

As the paper of the evening was to treat of "Different Phases of Porcelain Work," the society determined it was a subject which would admit of some consideration from many standpoints, so, although no essayist was present to groove the thought, the subject was declared open for discussion.

Dr. Perry opened remarks by taking us back to the days of the early Egyptians, where pottery baking seems to have been given birth, and then through the varying stages of enamel ware, the discovery of glass, the higher grade porcelain articles, etc., etc., and to the present-day plastic art in its wide and varied application. Never before—he told us—had he been so impressed with the beauties and intricacies of the wonderful art as he was this summer, after a visit to the Sevres porcelain factory abroad.

The effect that was given in the early days in the production of porcelain teeth was referred to. Many men, particularly in Boston and Philadelphia, used to carve their own teeth.

Then Dr. Perry described his visit to Dr. Jenkins in Dresden. He says that while there he became convinced that the low-fusing porcelain is probably the best for our purposes, and that Dr. Jenkins assured him that porcelain had a preserving influence when inserted in teeth that was beyond anything we have for that purpose.

The thought comes to the writer that good old Dr. S. B. Palmer may have greater light projected on his theories and at an earlier date than he had hoped for, with this "new era."

Dr. Perry apologized somewhat for his lengthy talk about Dr. Jenkins by saying that "if you know him you have to love him; if you love him you have to talk about him."

Dr. Rhein emphasized what Dr. Perry said about low-fusing porcelain, saying that he had arrived at the conclusion after several years of experimenting, and that for the best results a Jenkins furnace was necessary.

The edges should be finished subsequently to the hardening of the cement, just as one would for gold.

Dr. Geo. Evans says that he finds great advantage in placing inlay body in the matrix before removing it from the cavity and that it facilitates the better removal of same.

Dr. Le Roy described what he termed sectional inlays or fillings for restoring compound or complex cavities. It is sometimes impracticable to make fillings in one piece without sacrificing too much tooth structure. To divide the operation simplifies it very much.

A thought occurred to Dr. Perry, that a buccal and lingual section might be made for some cavities, the same to be keyed in place with gold.

Dr. Jarvie said he did not believe porcelain possessed any preserving qualities in itself, but that it lacked the destructive quality.

Dr. Perry disagreed with that. He said personal equation enters into the whole of placing gold in a cavity whereas porcelain can only be inaccurate about its margins. The subject was passed.

As final matter of business a committee was appointed to draft a proper document relative to Dr. Jonathan Taft's death.

Last Friday, after five, about a dozen members of the Odontological Society accepted Dr. Rhein's invitation to view his new operating light at his office.

It certainly is a revelation. An abundance of light is procured both for operating and illumination, and the shadow problem is about as completely overcome as it is possible to attain. The light consists of a cluster of four Holafen globes, pear-shaped, with the bases uppermost, the surfaces of which are so divided that small prisms result, which permits of such diffusion of light; each globe contains a 32-candle-power electric lamp—128 candle power in all. The apparatus is suspended from the wall by means of a bracket and pulleys, with a counter-balance. which permits of its being raised and lowered as desired. Considerable heat is emanated, which is the only objectionable feature.

Dr. Rhein showed also something brand new. An appliance for attachment to the hand-piece that permits of a blast of air from a compressed air apparatus being directed onto the bur and into the cavity, and by turning a small tap, a jet of ether can be projected by means of pressure, which anæsthatizes while burring.

Yours sincerely, "THE BOROUGHS."

LOS ANGELES, CAL., Oct. 5, 1903.

THE SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

Met at Los Angeles September 28th, holding sessions from Monday at 9 a. m. till Tuesday evening. Forty-three new members were added, making a total of 171. There were 130 in attendance at the meeting. This is thought to be the completest representation of the profession as a whole to be found in any given state or section of the United States. There are not more than fifty eligible practitioners, probably, who are non-members, in southern California.

Monday afternoon, and Tuesday from 9 till 3 o'clock, were given up to clinics. It is the policy and habit of the association to meet in Los Angeles alternate years, and to make the program here largely clinical. This because the city furnishes the majority of clinicians, is rich in material, and besides has the great advantage of the use of the college infirmary and laboratories.

So far the association has been conducted strictly for the good of its members one and all, free from factional strife or politics. Much of its success has been due to the earnest, self-sacrificing effort of the Secretary, Dr. L. E. Ford, whose faithfulness was rewarded in a measure this year by his election to the presidency.

The dues of the society have been and are now but one dollar a year. And there has always been sufficient money in the treasury for ordinary expenses. If something extraordinary arises, as, for example, a call for assistance by the State Board or Committee on Legislation, a small appropriation may be made, but the remainder is raised by private subscription.

It may seem to many members of the different state societies that the amount of yearly dues, whether one, three or five dollars, is a matter of small moment. So it may be to the few, but not with the many. Each man has many calls upon his purse, and as a rule must count his dollars closely. If one lives in a city, he may be a member of several dental societies, possibly of half a dozen other associations, fraternities and the like, and the aggregate of his yearly dues makes a considerable tax on his income.

Members of the state societies are often heard to lament that the rank and file of the profession do not attend and do not join. Three things would tend to an increase. First, more real, personal interest on the part of members in those on the outside; second, more emphasis on social and clinical features of the meetings, and third, a reduction of the amount of dues.

It is easy enough to say that membership in a state (or some other) society is worth $5, that anyone who will can raise the amount, etc. This may all be true, but they will not—"You pays your money and you takes your choice."

Bigger dues, smaller membership.
Smaller dues, bigger membership.

Those magic words, "only a dollar," have a wonderful effect on the average man, and it is the "average man" who is the object of solicitude with our expansionists. Witness the increase in circulation of the dollar dental journals.

Well, the September meeting of the Southern California Association was a great success. The next meeting, in the fall of 1904, will be held in San Diego. It will be more didactic and verbal, smaller, perhaps, but good. GARRETT NEWKIRK.

To THE EDITOR OF THE DENTAL REVIEW:

Dear Sir—At the November meeting of the Chicago Dental Society the following resolution was adopted: "Resolved, That it be the sense of this body that Dentistry is, and should be regarded as, a specialty of Medicine, with this understanding that to be fitted to practice it requires special fitting and training in dental schools or colleges."

In view of the fact that graduation in a medical college does not prepare a physician to practice dentistry, and in view of the further fact that graduation from a dental college does not prepare a dentist to practice medicine in any State in the U. S. A., of what utility to pass such a resolution? The holder of the D.D.S. or D.M.D. degree cannot register as a physician or surgeon in any State or Territory, and in most of the States such holder cannot be examined to practice medicine unless he has in addition an M.D. degree. All of the States of the U. S. A. have passed laws recognizing dentistry or dental surgery as a distinct profession, and to pass such resolutions as the above is simply ludicrous. I am a firm believer in the word advance, I believe in affiliation with medical men and medical societies, but such rubbish as that resolution implies, in face of the facts, is too much for me. A. W. HARLAN.

1000 Masonic Temple, November 4, 1903.

FOREIGN CORRESPONDENCE.

To THE EDITOR OF THE DENTAL REVIEW:

Sir—In the September number of THE DENTAL REVIEW, I have just read, upon page 871, a statement made by Dr. Ottolengui, in the discussion of his paper read at the fifteenth anniversary celebration of the Odontographic Society of Chicago, February, 1903, that "Dr. Jenkins is about to introduce a high-fusing porcelain which will have all the qualities of this low-fusing porcelain."

Permit me to say that this statement has been founded upon a misconception. For this misconception I am, however, responsible. In a letter to Dr. Ottolengui, written under frequent interruptions, I mentioned that I was about completing a new porcelain enamel for crown and bridge work and continuous gum, and that it melted at a somewhat higher temperature than porcelain enamel for inlays, although still below the melting point of gold. Doubtless I failed to accentuate the exclusive character of the new body and gave my correspondent an incorrect idea of its purpose.

I have never thought of making a high-fusing porcelain for inlays, or for any other purpose. It has been my object to produce a body which, through temperatures and refinements unemployed in other methods, should make porcelain restorations more easy and certain to the general practitioner. It would, therefore, have been a stultification of the labor of years for me to have essayed the comparatively simple task of producing a high fusing body, as well as a work of supererogation, since there already exists a sufficient number of excellent products of this nature.

I am, sir, with great respect,

Yours very truly, N. S. JENKINS.

Dresden, October 15, 1903.

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, THE DENTAL REVIEW, 55 State Street, Chicago, Ill.]

* * *

Investment Compound: — Plaster of Paris, two parts, and portland cement, one part, makes the quickest setting and most reliable investment I have ever used.

SYLVESTER MOYER, Galt, Ont.

* * *

Tin-Foil for Protecting Cement While Setting: — In cases where moisture can be excluded but a short time, press a piece of tin-foil over the fresh cement. It will adhere and protect the cement until hard.

MARK G. MCELHINNEY, Ottawa, Ont.

* * *

Easy Method of Removing Crowns or Bridges While Fitting: — Place a dry napkin or small square of bleached muslin over the crown or bridge and grasp firmly between the thumb and forefinger of right hand. A slight lateral movement will dislodge the appliance without marring it.

L. S. LA PIERRE, South Bend, Ind.

* * *

Gas Apparatus: — If owners of the Heckard gas apparatus will purchase a Teter nasal inhaler and have a metal T made so that the tank will have two outlets, they will find it advantageous to use both nose and mouth for anæsthetizing in some cases. A stop-cock on both will enable the operator to use one independent of the other, if desired. W. A. HECKARD, Indianapolis, Ind.

* * *

Protect Your Patient's Eyes While Operating: — A pair of dark eye-glasses are invaluable for this. A number of patients complain of the light being too strong. The glasses will also protect the eyes from flying particles which are caused by the use of pumice, disks, strips, etc. I have often seen eye-glasses covered with the above-mentioned debris.

HOMER ALMON.

To Produce a Glossy Surface on Wax: — After having made the wax base plate as smooth as possible in the ordinary way, if a hard, glossy surface is desired, coat the surface with chloroform several times and with a small mouth blowpipe go over the wax carefully. The chloroform will cause the surface of the wax to melt at a lower temperature, leaving a smooth, hard surface. C. J. Hadley, Chicago.

Don't: — Don't "farm" the lodge, church, club, council or organization of any kind. Such methods should be beneath any dentist or any man. Take to any or all of these you may wish to join a field which is all your own, and so make them bigger and better "farms," because of your association. But remember that every old field in any of these "farms" has been cropped to death and needs a rest. H. Darling, Bay City, Mich.

Cement Mixing Slab: — I have never found anything better for mixing cement than a flat, six-ounce prescription bottle. Its value lies in its thickness, as it brings the upper surface high enough above the table to render the mixing easy. Used in hot weather, cold water can be placed in the bottle, thus retarding the setting qualities of the cement, or if it is desired to increase the rapidity of the setting of the cement, warm or hot water can be placed in the bottle. C. R. Taylor, Streator, Ill.

Gold Plating Outfit: — Gold chloride, 15 grs.; potassium cyanide, 18½ grs.; water, ½ oz. Mix, place in a porcelain vessel and warm to near the boiling point. Be sure to have appliance to be plated clean. Wrap a strip of sheet zinc ½ inch wide around the appliance and hold in above solution from one to five minutes. Remove, and if plate is not as heavy as desired, polish with chalk and brush wheel and place in solution again. This can be repeated as often as is necessary to obtain the desired results. A. S. Waltz, Decatur, Ill.

To Apply Rubber Dam with Ivory's Clamp: — Punch hole in rubber, stretch over wings of clamp, apply clamp to tooth and slip rubber off wings of clamp. If the cavity involves only the occlusal surface this is all that is necessary, but should it extend to either the mesial or distal surface it is only necessary to pass the rubber between the teeth on the side containing the cavity. This was suggested by seeing a young graduate endeavoring to work the edges of the rubber between the teeth when he had only to fill a simple occlusal cavity.

R. E. Sparks, Kingston, Ont.

Gold Tip for Artificial Teeth: — Prepare the tooth by beveling the lingual side of the occlusal end. Adjust a thin backing of pure gold, burnishing it well over the ground surface. Another backing should now be placed in position, but instead of adapting it to the occlusal end it should extend straight down beyond the edge slightly longer than the width of tip required, to allow for finishing. This leaves a V-shaped space between the first and second backings, which, after removing from the facing, and kept in proper relation, can be filled with solder.

Oliver Martin, Ottawa, Ont.

Safe Method of Forcing Escharotics Through Fistulous Opening: — Wrap cotton on a smooth broach, saturate with carbolic acid or other escharotic and insert in root canal. Fill the cavity with gutta-percha, puncture the filling and insert the nozzle of either a water or hypodermic syringe. The medicine can now be forced through by pressure on the syringe, leaving the cotton in the root. In some cases it is advisable to hold the finger on the opening of the fistula until considerable pressure is felt. This expands the whole fistulous tract, allowing the medicine to enter all folds.

J. Mills, Brantford, Ont.

Root Filling Material: — Gutta Percha base plate, weight ½ oz. Saturate solution of thymol in eucalypti, measure ½ oz. Dissolve gutta percha in chloroform, add thymol and eucalypti and mix thoroughly. Set aside to allow chloroform to evaporate.

In manipulating the above, after the tooth is dry place some of the filling in the pulp chamber and with a warm broach work it into the canals. It can then be forced to the apex with a soft piece of rubber, and the gutta percha cone inserted in the usual way. If the canal is too small to admit a cone, a fiber of cotton may be used, or if too small for cotton, the filling can be forced into the warm canal with soft rubber, which is far better than no filling. I believe this to be much better than chloro-percha, for two reasons, viz.: the presence of thymol and eucalypti, and no change in the material shape. After nearly five years' test in the mouth, I have found a distinct odor of the thymol and eucalypti.

B. L. Cochran, Burlington, Iowa.

MEMORANDA.

OHIO STATE DENTAL SOCIETY.

The thirty-eighth annual meeting of the Ohio State Dental Society will be held at the Great Southern Hotel, Columbus, O., Dec. 1, 2, 3, 1903. Visitors cordially welcomed. S. D. RUGGLES, Secretary.

BOARD OF DENTAL EXAMINERS OF PENNSYLVANIA.

Examinations will be conducted by the Board of Dental Examiners simultaneously in Philadelphia and Pittsburg, December 15-18, 1903.

For application papers or any information, address Hon. Isaac B. Brown, Secretary Dental Council, Harrisburg, Penn.

AMERICAN SOCIETY OF ORTHODONTISTS—A CORRECTION.

The meeting of the American Society of Orthodontists will begin on Thursday, December 31, 1903, instead of on Wednesday, December 30th, as previously published. The meeting will be held at the Iroquois Hotel, Buffalo, N. Y., and promises to be most interesting.

ANNA HOPKINS, Secretary.

DEATH OF DR. SCHNELL.

We regret to learn of the death, on October 21, 1903, from tuberculosis, of Dr. Philip J. V. Schnell. Dr. Schnell was born in Chicago in 1867, was graduated from the Chicago College of Dental Surgery, class of 1891, and had practiced in the city up to the time of his illness. He was a promising young man, and his early death is deeply to be regretted.

THE HARTFORD DENTAL SOCIETY.

At the annual meeting of the Hartford Dental Society, held October 12, 1903, the following officers were elected: President, Dr. Edward Eberle; Vice-President, Dr. Albert W. Cowee; Secretary, Dr. A. E. Cary; Treasurer, Dr. Ernest R. Whitford; Executive Committee, Dr. C. E. Barrett, chairman, Dr. F. Dewey Clark, Dr. C. C. Prentiss; Librarian, Dr. Wm. A. Damon; Historian, Dr. Nelson J. Goodwin.

COLORADO STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Colorado State Board of Dental Examiners will be held at the Capitol in Denver, beginning Tuesday, December 1, 1903. All applications for examination must be filed with the Secretary before that date. Examinations are theoretical and practical, and applicants must be prepared to do such practical work as required.

For further particulars, address, M. S. FRASER, Secretary,
407 Mack Block, Denver, Col.

RECENT PATENTS OF INTEREST TO DENTISTS.

739,674. Dental spraying apparatus, John C. Holson, Ord, Neb.
739,333. Dental instrument, Wm. J. Miles, Jr., Middletown, Ohio.
739,980. Educational appliance for dental students, Charles F. Bryant, Chicago, Ill.
740,096. Fastening device for artificial teeth, Charles A. Davis, Pasadena, Cal.
740,549. Dental pliers, Virgil W. Gilbert, Philadelphia, Pa.
740,551. Dental cutting tool, Wm. C. Gillespie, Nashville, Tenn.
740,586. Toothpick, Johan A. Ohlsson, Brooklyn, N. Y.
741,071. Dental appliance, Leopold A. de Rosa, Philadelphia, Pa.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, solicitor of patents, Fendall Building, Washington, D. C.

RESOLUTIONS ON THE DEATH OF DR. JONATHAN TAFT.

WHEREAS, After a long and useful career of sixty years, as practitioner, author, journalist and teacher, death has ended life's work of Prof. Jonathan Taft, who was universally loved and respected by the dental profession for his scholarly attainments and high ethical standing.

WHEREAS, In the death of Dr. Taft, our profession has lost an advanced thinker and an able and enthusiastic exponent of the best in dental surgery; be it

Resolved, That the Fraternal Dental Society of St. Louis extend our sincere sympathy to Mrs. Taft in her bereavement, which is the bereavement of the whole profession, and express our high regard for the worth and character of this pioneer, who so ably exemplified the highest ideal of American dentistry.

Unanimously adopted, October 20, 1903.

W. L. WHIPPLE, President pro tem.

E. E. HAVERSTICK, Secretary.

INSTITUTE OF DENTAL PEDAGOGICS.

Program of the meeting to be held in Buffalo, December 28th, 29th. 30th, at the Iroquois Hotel. All interested in education and the elevation of the standards of the dental colleges and students are very earnestly requested to attend this meeting.

1. President's address. "Some Faults of the Prevailing Dental Training." By Dr. J. D. Patterson, Kansas City. Discussion by Dr. John I. Hart, New York; Dr. B. Holly Smith, Baltimore; Dr. H. P. Carlton, San Francisco; Dr. Geo. E. Hunt, Indianapolis; Dr. R. H. Hofheinz. Rochester.
2. Prosthesis. Two papers. (a) "Methods of Teaching the Artistic Elements of Prosthetic Dentistry." By Dr. A. O. Hunt, Omaha, Neb. (b) "Methods of Teaching the Anatomical Arrangement of Teeth." By Dr. B. J. Cigrand, Chicago. Discussion by Dr. N. S. Hoff, Ann Arbor; Dr. G. H. Wilson, Cleveland; Dr. R. R. Freeman, Nashville; Dr. F. H. Berry, Milwaukee.
3. "An Ideal in Pathology." Paper by Dr. D. R. Stubblefield, Nashville. Discussion by Dr. H. A. Smith, Cincinnati; Dr. T. B. Hartzell. Minneapolis; Dr. A. H. Peck, Chicago; Dr. O. L. Hertig, Pittsburg.
4. "Orthodontia Technology." Two papers. Dr. S. H. Guilford, Philadelphia, and Dr. C. S. Case, Chicago. Discussion by Dr. W. E. Grant, Louisville; Dr. A. E. Webster, Toronto; Dr. H. B. Pullen, Buffalo; Dr. H. T. Smith, Cincinnati.
5. "The Value of Instruction in Dental History and Literature." Paper by Dr. H. L. Ambler. Discussion by Dr. Charles McManus, Hartford; Dr. J. H. Kennerly, St. Louis; Dr. B. J. Cigrand, Chicago.
6. "Porcelain Technology." Paper by Dr. H. J. Goslee, Chicago. Discussion by Dr. J. Q. Byram, Indianapolis; Dr. Ambler Tees, Philadelphia; Dr. L. E. Custer, Dayton; Dr. H. L. Banzhaf, Milwaukee; Dr. J. F. Ross, Toronto.
7. "The Dental Curriculum." Paper by Dr. Geo. E. Hunt, Indianapolis. Discussion by Dr. G. V. Black, Dr. J. B. Willmott.
8. "How Shall Quizzes be Conducted?" Symposium by Dr. F. D. Weisse, Dr. R. H. Nones, Dr. L. P. Bethel.
9. Exhibition of recent teaching appliances. Dr. W. G. Foster, Baltimore; Dr. L. S. Tenny, Chicago.
10. Report of master of exhibit, Dr. Ellison Hillyer, Brooklyn.
11. Banquet, Wednesday evening.

Obituary.

Dr. Jonathan Taft.

When the word was flashed over the wires to the Editor that Dr. Jonathan Taft was dead, it seemed that at that one stroke an immense force had passed out of the dental profession. Dr. Taft from his earliest days in a struggling profession had always stood for the best and noblest in his chosen calling, and his name will forever be linked with some of the greatest advances in dentistry. It was our pleasure to greet him on the occasion of his rounding out sixty years in practice, and we shall never forget the innate vigor and clearness of thought of the old veteran as he stood before a class of dental students on that occasion and counseled them on the proper performance of their professional duties. It was a lesson never to be forgotten by those who heard it

Dr. Taft has passed away, but in the memory of thousands of practitioners all over the land, his name will be held as a cherished heritage, and his example will continue to spread its beneficent influence far beyond the confines of those with whom he came in actual contact. He was a power for good in the profession, and its members will love to honor his name as long as the records of dentistry are written.

The following account, taken from the Ann Arbor Daily Argus, of October 16, 1903, gives the chief events of his long and useful life:

"Dr. Jonathan Taft, for 50 years a professor of dental surgery and the man who organized the dental department of the university in 1875, died at about midnight last night, after a short illness of but a few days. He literally died in the harness, for he was engaged in the active work of his profession until Tuesday morning.

"Jonathan Taft was born September 17, 1820, in Russellville, Brown county, Ohio. His father, Lyman Taft, was a native of Massachusetts and came to Ohio in 1818. Young Taft was educated in the common schools and a small academy in Brown county, where he was a classmate of General U. S. Grant, and taught school for four years. In 1841 he began the study of dentistry in the office of Dr. George D. Tetor, in Ripley, Ohio, and began practicing for himself in 1843 in Ripley. In 1844 he located in Xenia, Ohio, and practiced there until 1858. He graduated from the Ohio College of Dental Surgery in 1850, and in 1854 he was appointed professor of dental surgery in the same institution and occupied this chair until 1879, when he resigned because he had accepted a similar position in the University of Michigan. While connected with the Ohio College he was Dean for the larger part of the time. In 1856 he began editorial work on the Dental Register, a monthly periodical, which position he held until January, 1900. In 1857 he moved to Cincinnati and established a fine practice which he relinquished in the summer of 1901 and moved to Ann Arbor. In 1859 he wrote a text-book on Operative Dentistry, which for many years was the standard work on this subject. In 1875 he was invited to organize the dental department of the University of Michigan, and accepted the professorship of Principles and Practice of Operative Dentistry.

"The first session was held the winter of 1875 and 1876. He was made Dean of the department which he established on the highest educational basis known at that time, and he has ever since striven to keep its standard as much in advance of other institutions as the professional advancement would allow. Through his efforts the course has been extended from two years of six months and a first year high school preparation for admission, to a course of four years of nine months and a high school graduation for admission, making it the highest educational standard known.

"He was a member of every important organization for the advancement of his profession, and probably attended and participated in more dental conventions than any other man. He spent much of his time and means in efforts to advance the profession's interest through dental societies. He was probably the best known man in his profession. Through his college work, his editorial work, and his general interest in professional affairs, he had much to do with advancing professional standards as well as attainments.

"As a scientific worker he has never made attainments such as other men, who have devoted their energies entirely to this branch, but he has always kept up with every advance made in the scientific as well as the technical departments of the profession and, by his suggestions, he has given inspiration and encouragement to many men who were laboring in these directions. He has always stood for high professional attainments and rejoiced in any advancement in dental scientific or technical knowledge.

"In his religious life he was a devoted member of the Congregational Church, and occupied prominent places in the councils of this denomination, of a national as well as local character. He was for twenty-five years superintendent of the Sunday-school of the Vine Street Congregational Church of Cincinnati, and for nearly as long assistant superintendent of the Bethel Sunday-school, a large mission school, having an attendance of from two to three thousand children. He was registrar of the Miami Congregational Conference for nearly thirty years. He was greatly interested in all benevolent objects and gave largely of his means and time to such calls. As a man he was beloved by all who came in contact with him.

"While a man of the greatest will power, he was always kind and ready to make such concessions as would overcome trouble. In this respect he had a remarkable control of his natural disposition, which was always aggressive and single-minded. To do what he thought was right was always uppermost in his mind, but he readily made such concessions as would seem for the welfare of those about him.

"In 1842 Dr. Taft was married to Hannah Collins of Ripley, Ohio, who died in 1888, and in 1889 he married Miss Mary Sabine of Cincinnati, who survives him. Two sons, Dr. Wm. Taft, of Brewster, N. Y., and Dr. Alphonse Taft, of Cincinnati, and one daughter, Mrs. A. T. Edwards, of this city, by the first marriage, are now living.

DIFFICULT LOWER DENTURES.

By L. P. Haskell, D.D.S., Chicago, Ill.

It seems to me, from recent experience in various cases of lower dentures, that from some unexplained cause, lower jaws undergo a serious transformation. In former days there was nothing like it.

Absorption takes place rapidly, no matter what material for plates is used, until the alveola disappears, leaving a flat, narrow surface. In some cases results in a depression, especially where a partial lower has been worn. I have one case where there is a groove along the whole jaw.

Then often the membrane is loose and flabby over portions, and sometimes the entire surface.

To add to the difficulty, the muscles and glands upon the lingual side are lifted high above the margin of the jaw, so it is impossible for the plate to extend below the margins without being constantly lifted and displaced.

In some cases the jaw is left upon a slope in front, so with no hold on the lingual side, the plate slides forward.

For many years I advised the use of additional weight, by using the cast-metal plates, until a personal experience in my own mouth taught me a lesson. Having no ridge to hold it in place, the plate would slide forward when leaning forward to speak to a student at the bench; or slide sideways upon lying down in bed.

I found from my own exprience that weight is not a necessity on the lower jaw.

From this condition of things I always say to a patient, don't be surprised if irritations occur, but do not try to endure it any longer than it will take you to come to me for relief. It is utterly impossible to masticate upon an irritated surface.

The plate should be in long enough before visiting the dentist to show the irritated spot. To clearly locate it on the plate, place a little moistened whiting on the curve of a spatula on the spot; put the plate in place, and upon removing it the place for relief is clearly indicated.

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ORIGINAL COMMUNICATIONS.

TEACHING APPLIED PHYSICS.*

BY G. V. BLACK, M.D., D.D.S., CHICAGO, ILL.

In dentistry there is so much that should be approached by the student from the general standpoint of the phenomena usually classed under the head of physics that it has seemed to me that it would be best to group these into a special course of instruction that should in the main assume the character of laboratory work.

This would be very distinct from the technic courses which I introduced in 1888 which have since had their regular place in dental schools, and have produced excellent results. These courses serve to train both the mind and the fingers in the technical procedures in dentistry, and incidentally give the student a certain practical acquaintance with the physical properties of the materials which he handles. Through this work he learns, in operative technics, the physical forms, or the anatomy of the teeth, their behavior to cutting instruments, gains a special knowledge of the hardness and brittleness of enamel and dentine, gains some knowledge of the properties of steel, and of the forms and uses of steel instruments in dentistry. In prosthetic technics the student gains a similar knowledge of the metals, porcelain, rubber, Plaster of Paris, and other material things that we use together with the technical procedures in that use.

In all of this teaching the principal factors are the technical procedures and the training in finger skill. The teaching of the physical properties of the materials is incidental and such as is derived through the senses by the ordinary handling of the material. In our professional development it is becoming apparent that something more is necessary to properly equip our students to meet the requirements of practice. The question comes as to whether we will be able to develop this, now that we will have a course of four years instead of three. The object of this paper will be to point out the general subject matter of such a course rather than to attempt now to give the particular forms of the laboratory teaching.

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*Read before the Institute of Dental Pedagogics.

In this course in applied physics it has not been my thought to do much with the general subject of physics as taught in our high schools and colleges. Our students should come to us with at least the outlines of this knowledge, though with our present requirement of only two years in the high school many of our students have but a slight knowledge of it; many, none at all, while the few only are really well prepared. Some of our high schools have well equipped physical laboratories, some are indifferently equipped, and many have no laboratory apparatus whatever. I have studied this matter pretty closely in the credentials of students and the reports from high schools, and find with some chagrin that the high school work, even to graduation, cannot be relied upon as a good preparation for the work in applied physics that we need to install in our dental schools. Our students ought to come to us well grounded in the phenomena of force and motion and the physical relations of the more common material things to these phenomena, but as a body they do not. This is all the more surprising when we consider that the material improvement in our knowledge as a people upon which the great prosperity of the nation is based is principally of the laws of force and motion in their application to material things. For these reasons it is probable that a part of the time of a class in applied physics should be spent rather upon some portions of the general subject as well as upon the application of physics in dentistry.

I should think it especially well to go over the detail (briefly) of electrical phenomena, in their relation to the production of motion (or power) and heat, and the conditions of its use in motion and heat production. This much seems to be demanded by the extensive employment of electricity in dentistry. This should be a laboratory course with sufficient apparatus to display the phenomena very fully and enable each student to develop them himself under proper direction. The course should include wiring, placing fuses, etc., with all necessary precautions for safety, determinations of polarity, voltage, placing of resistance apparatus, etc., and the effects of these in their relation to heat and motion production under all of the known conditions of the use of electricity in dentistry.

The X-Ray, which has come into such prominent use in orthodontia and oral surgery, should receive its share of study. This, on account of its necessary connection with photography, would for the present take the form largely of demonstration, such as would render students familiar with the general detail of its use, the conditions of its successful use, and the conditions demanding its employment.

The other subjects taken up, while purely of the physical type, and to be dealt with as studies in physics by laboratory methods, would be especially dental subjects applying, if possible, more directly to our daily operations. They would be such as the following, which I will present briefly as questions to be answered by laboratory exercises with the proper physical apparatus, or as studies to be pursued in a similar manner. The necessary physical apparatus or instruments for this work have now been developed in nearly all of its lines, but I have no doubt that with the general adoption of such a course many improvements would quickly follow.

What force can be exerted by the human jaws in closing the teeth? What are its averages, and its variations among healthy normal persons?

What is the average force used in chewing foods, its normal and accidental variations?

What is the average weight endurance, without actual pain, of the peridental membranes of different classes of teeth, as molars, bicuspids, incisors, etc., and what are the relative capabilities of the roots of these several classes of teeth in sustaining crowns and the abutments of bridges? These would be determined with the gnathodynamometer.

What is the apparent necessity of X-Ray pictures for ascertaining the length and strength of roots of teeth upon which abutments of bridges are proposed to be sustained?

What is the average and the ordinary variations of force required in crushing particular articles of food? Determined with the phagodynamometer.

What is the actual strength of a human tooth, incisor, cuspid, bicuspid, or molar, as a whole, to breaking or crushing force, first against steel, against which but a minute area of tooth surface will be engaged, then against annealed brass which will be slightly indented allowing the contact of a greater area, then against lead and the softer metals, or against hard wood? These would be determined with the dynamometer on freshly extracted teeth, or those that had not been allowed to dry.

What is the strength of walls of cavities to breaking stress in conditions in which we find them in practice? (This would be done by selecting and preparing cavities in freshly extracted teeth and then submitting the walls to breaking stress in various forms with one of the dynamometers.)

What is the strength of blocks cut from human dentine (8-100 inch square) and the comparative strength in the different blocks from the same tooth and in the teeth from different persons. This would be more difficult of introduction because of the expense of the necessary machines for cutting the blocks.

What is the strength to crushing or breaking stress of blocks of porcelain especially made for test in definite sizes. This would give the first practice in breaking porcelain under conditions controlling exactness of work and accurate determination of results.

What is the strength of porcelain teeth as mounted as artificial crowns? (Trials of different forms of mounting and different manufactures of teeth.) In this, crowns would be mounted in the technic laboratory for trials in the physical.

These trials would be made with the dynamometer so rigged, or arranged that the tooth might be held at any angle to the line of force to obtain its strength at the different angles of force found in the occlusion and the varying inclinations of the teeth in the mouth. This set of tests tell some wonderful stories of the variations of strength in the various positions and inclinations in which teeth are mounted. Often teeth that will sustain a load of one hundred pounds in one inclination will break at fifteen pounds in another. And with sufficient study of these tests such differences can be predicted with certainty when the relation of the tooth to the line of force is seen.

What is the power of pure hammered gold to sustain stress, taken in blocks of definite size, say one-tenth inch square, or what pressure in pounds will be required to reduce the length 1 per cent, 5 per cent, 10 per cent, etc.?

In what proportion is this power lost in annealing?

What temperature (about) is required in annealing as shown by the softening apparent in dynamometer tests?

(All of this class of tests must be made with the dynamometer with micrometer attachment in which the reading of pounds pressure and amount of condensation are obtained as one operation.)

What is the effect upon the power of gold blocks in sustaining stress of 10 per cent of alloy, of silver, of copper, or of 10 per cent of alloy, of equal parts of silver and copper, etc., or of other metals *ad libitum?*

What is the stress required to bend bars of some definite size of pure hammered gold or platinum? What is the effect of annealing these bars on the stress required to bend them—on the stress required to break them? What is the relation of this stress to the strength of the human bite?

What is the relation of bending or breaking stress to the length of the bars, the size being equal?

What is the effect as to bending or breaking strength of alloying platinum with 5, 10, 15 or 20 per cent of gold or of alloying gold with similar proportions of platinum or with silver, copper, or silver and copper, etc.?

In all cases the tests should be made with hammered or hard rolled bars and with annealed bars. These tests would be made with the dynamometer or with falling weights.

Tests of the fusing temperature (comparative at least) can readily be made in the electric furnace that will develop the physical characters in that direction and give valuable practical instruction regarding the formation of solders. Tests of the *fluidity* of solders of different compositions may readily be made in the electric furnace by comparative rotundity or flattening of globules of definite size brought to degrees of heat between the melting point of the solders and metals to be soldered and allowed to cool on a flat surface. This fluidity has directly to do with the *easy flowing* of the solders.

What is the density or specific gravity of pure hammered gold? What density may be attained in making gold fillings by hand pressure, or by mallet pressure, using steel matrices?

This test of density should be made by weighing in air and in water at a given temperature, and also by measurement and weight and checked up for comparison.

The same gold blocks are then tested for condensing pressures with the dynamometer and the results checked up for comparison. In this experience will show that the force of the blows used, and the character of the resistance (whether the matrix is held upon a solid or a spongy support) used in making the filling, may give a hard filling resembling hammered gold or a soft filling resembling annealed gold with similar differences in their power to carry heavy stress with or without marked yielding. These fillings can now be made in the manudynamometer in which each thrust of the instrument with its force in pounds may be recorded, or in the tuptodynamometer with a similar record of the number of blows and the force of each.

A study of the force of the hand pressure thrust with the pen grasp and with the palm grasp with their variations in different individuals by use of the manudynamometer.

A study of the force of the blows of the mallet and of the condensing power of mallets of different weights with the tuptodynamometer.

A study of the force of blows with weights of ½ oz., 1 oz., 2 ozs., 3 ozs., etc., falling from different measured heights with the falling weight apparatus. This may be done on the tuptodynamometer with polished blocks of boxwood, showing the penetration by comparison with a thrust pressure of a definite measured number of pounds made with the registering dynamometer. This will give evidence of the actual number of pounds contact force in blows delivered as distinguished from foot pounds, or the impulse of the blow. This latter may be more accurately studied by delivering the blows of falling weights and the dynamometer thrusts on blocks of annealed brass with instrument points of definite measured size and measuring the penetration with a micrometer that will work easily and conveniently to the ten-thousandth of an inch.

This study will open up in a definite experimental way the whole question of the contact force of blows in comparison with the foot pound power or impulse producing force. This and the instruments for its development are new, in the combinations used, to the science of mass motion and force and will develop a distinct line of new facts regarding the contact force in mass motion and resistance. This study may be varied in a multitude of ways, giving a wide insight into this very interesting subject. It will, in all of its variations, give a wide divergence between foot pound force, whch is impulse producing, and contact force in pounds weight. The contact force measured in pounds is the condensing force used in condensing gold, not the impulse producing force, or foot pounds. Much of the text of the books on physics may be used in this study.

A study of amalgam alloys.

The formations of amalgam alloys of silver and tin, melting in air, or in the open crucible, melting under fluxes and a study of oxidation and loss. Melting in the closed electric crucible with studies of differences in oxidation and loss.

A good short line of studies may be had by forming alloys of silver and tin in the following proportions: Silver 40, tin 60; silver 50, tin 50; silver 60, tin 40; silver 70, tin 30. For testing the modifying metals, five per cent of the silver may be substituted by an equal weight of copper, zinc, cadmium, gold platinum, aluminum, etc., *ad libitum,* and these combinations will be used in the tests of alloys. Other lines of formulae may be adopted in greater or smaller number, giving such range of study as time will permit.

In this there is accurate practice in weighing metals into the crucible and weighing the ingot, also in taking the specific gravity of the metals before placing in the crucible, finding the mean specific gravity, and then taking the specific gravity of the ingot and noting the condensation in the formation of the alloy. This, if done with sufficient accuracy, becomes an index to the degree of actual alloy formation as distinguished from the mere mingling of metals without actual alloying.

Cutting alloys, annealing cut alloys.

Experimental studies of the proportion of mercury to alloys required to make amalgams with alloys composed of different proportions of silver and tin.

The same experiments repeated with the same alloys after annealing, showing differences in the proportions of mercury required in making amalgams with fresh cut or unannealed and annealed alloys, and the variations in the consistence and physical qualities of the amalgams formed. In this there is also accurate practice in weighing alloys, mercury, and the mass formed, showing also percentage of loss in handling.

Still using the same alloys. Fillings are made in steel tubes using the binocular microscope in testing accuracy in finishing to margins followed by measurement of contraction and expansion during setting and following setting, or until movement ceases, a period of from five to thirty days.

In these tests each experimental filling would be followed with micrometer tests, observation of the movement with the binocular microscope and in companion fillings with specific gravity tests until movement ceased.

Also tests of the results of mixing instead of actual alloying, which give very striking results, are made by weighing one-half the amount of alloy required to make a test filling, and then adding to, and commingling with this an equal part of the fillings of silver and of tin in the exact proportions in which these metals exist in the alloy. This mixture is then treated in every way as the alloy in making an amalgam and carried through all of the tests.

Examination of the stress required to crush fully set amalgam blocks to obtain the comparative strength.

A study of the flow under stationary stress of each amalgam to obtain its power of endurance under stress.

These two studies will be made with small blocks of definite size made from the same alloys used in other tests.

A study of the shrinkage and expansion of oxyphosphate cements by making fillings in steel tubes followed by micrometer measurements and observation with the binocular microscope under varying conditions of mixing. Also when kept dry and when kept wet using various makes of cement.

A study of the penetration of cements by colored fluids which denote the degree of penetration of moisture. These studies give good perceptions of the usefulness, or uselessness, of the various cements for temporary fillings and if followed by chemical experiments displaying their solubility will give a fairly good idea of their probable endurance.

A study of the expansion of Plaster of Paris with a micrometer for its accurate measurement.

Then a study of the warping of plaster under the conditions of its use in taking impressions and making casts.

In this there is a wide range of opportunity for the teacher to display his ingenuity in improvising cheap apparatus that will show to the eye exaggerated warpage and the conditions of its occurrence.

This should be followed with a study of plasters from different sources, together with a study of methods of keeping after calcining, or of the effects of weather upon the plaster and the necessary precautions to maintain the physical properties of plaster in the best condition for our use.

I have now enumerated subjects of study, every one of which is important in dentistry, the reasonably perfect pursuit of which would require the time of the student three hours per day for two years of the dental school course of seven months each year, excluding holidays and the time taken up in examinations. It is at once clear that as schools are at present constituted, or as they will be in the four years' course, this work can be done only in part. Much abridgement would have to be made in any attempt to follow out such a course. For instance, a course in amalgams may be undertaken with several different ideas in view. First, it may be undertaken with the view of that completeness of the study of the metals and their manipulation as will render the student fit to undertake the commercial manufacture of alloys. This would require 288 hours of laboratory work, two-thirds of a year, three hours per day. This is clearly not the dental student's province, and not the work of the dental school as such. A very much shorter course will render the student intelligent as to the physical properties of alloys and the basic principles of their formation and use. This he ought to have as a dentist. This he must have in order to use amalgams in a manner to develop the highest good in their use. For this a well selected abridged course occupying three hours every other day for six weeks (90 hours) would give a fair degree of instruction. This could be given in sections in which about eight students could be grouped with one set of instruments, with the exception of the cheaper articles, as tubes, matrices, etc., and materially reduce the expense for instruments, while some of the more expensive instruments, as the amalgam micrometer, measuring to ten-thousandths of an inch or to microns in the metric system, would be really used mostly by the demonstrator and one would answer for the entire section. By certain inexpensive modifications the amalgam micrometer becomes the essential instrument for all of the very delicate measurements, and may be used for many purposes in various parts of the course.

A course in the examination of the physical properties of gold similar to that detailed would be a most important part of the work. The importance does not relate so much to the gaining of knowledge that gold has such and such a specific gravity under such and such conditions as in having seen and realized the conditions and having worked them out by exact methods. The simple filling of a matrix with gold and making test of its density is of less value than the study of the particular methods of making the filling, the force used, the perfection of the surfaces against the walls and in angles of the matrix as observed by microscopic examination after removal of the filling. These combined observations tell in shaping the future practice of the student. This is a class of observation the student cannot obtain with present methods of teaching. A very extended course is not so necessary as a very carefully conducted course.

The double bow spring dynamometer with micrometer attachment making measurements at one-thousandth of an inch or to a similar grade in the metric system, as desired, used especially in the gold and amalgam work, is another of the very expensive instruments that may, by cheap arrangement of points and holding apparatus, be made to do duty in all departments where accurate trials of strength or measurements of compression are required.

The *thrust dynamometer*, which I called the phagodynamometer at first because of its special arrangement for testing the force required in chewing food, is by varying the arrangement of its jaws to different purposes serving a multitude of purposes, and by reason of the great facility of use it at once becomes the instrument for the measurement of force in breaking and bending stress under any conditions in which the measurement of condensation is not a feature of the operation, as for breaking porcelain, porcelain teeth, bending bars of metals, etc., and registering the number of pounds required.

The falling weight apparatus is less extended in its uses, and more nearly confined to uses in the more purely scientific sense, and yet serving to impart very practical lessons. It is particularly essential in the study of the effect of mass motion and the contact resistance in the arrest of motion. When used in conjunction with the tuptodynamometer and the thrust dynamometer for this purpose it becomes one of the essential instruments in measuring accurately the contact force of blows such as are given with the mallet.

In all of this study of mass motion, resistance, contact force or impulse producing force developed by blows, and gaining an insight into the real nature of these it is one of the essential pieces of apparatus.

In the teaching with this instrument much of the subject matter may be drawn from the text books on physics and yet none of these will be found to develop the material facts of the force developed in the contact of mass in motion when meeting with absolute or modified arrest of motion by resistance, as I should wish to display it with this instrument. This, of course, cannot be further discussed in a paper of this character.

The manudynamometer is the most essential instrument in giving the student a correct estimate of the power with which he is able to handle instruments and in pointing out his deficiencies. Practice with this points the way to essential improvement, partly by showing the differences among persons in the development of the muscular power of the hand, partly by the direction this gives to effort, but most important of all it brings the teacher and student to understand each other in the use of terms relating to the use of force and renders teaching along all of these lines more exact and impressive.

The expense of these instruments is a serious drawback to the introduction of such a course, for without them a laboratory course, such as is contemplated, is out of the question. If there were orders for a sufficient number at one time the expense of the instruments could be materially reduced, for the reason that the wholesale manufacture is very much cheaper than making single instruments. The instruments can be conveniently made in sets of about twelve or sixteen of each, but would be still cheaper if fifty or a hundred could be made in a single lot. If made in that way, by the wholesale, they would not be very expensive, for such an order would justify the development of special apparatus for their manufacture.

Supposing the instruments to be made in lots, half dozen each, the cost would be something as follows:

Amalgam micrometer with 50 tubes	$125.00
Double bowspring dynamometer with micrometer attachment	75.00
Thrust dynamometer	50.00
Fixtures accompanying	25.00
Falling weight machine with anvil	45.00
Tuptodynamometer	60.00
Manudynamometer	60.00
Accessories	50.00
Gnathodynamometer	20.00
Binocular Microscope with ¼-inch lense	60.00
Machine for cutting teeth, with electric motor	80.00
Scales and weights and accessories for specific gravity and other work	40.00
Expansion micrometer for Plaster of Paris	50.00
Electrical apparatus	100.00
Crucibles for melting metals, electric	10.00
Total	$850.00

The cost of material per student would be from five to eight dollars, principally for gold and platinum, while more than this might be used. Most of the noble metals, except gold foil, could be sold for about their cost, the expense representing the loss.

In making out the list it has been supposed that certain of the electric motors, electric ovens, electric annealers, etc., in ordinary general use in the school might on occasion be used in the physical laboratory. If we must suppose that all of this be especially purchased the expense would be greater. The X-Ray apparatus has also been left out of this count.

Some of these instruments, and especially the more expensive ones, can be made to serve the whole class, even in the larger schools, but matrixes in which to make experimental fillings, electric crucibles, and many of the less expensive accessory pieces would need to be duplicated so that each would be used by a small section. A binocular microscope would serve a group of six or eight students very well, and as this instrument is used in but a portion of the course it is not impossible that by a skillful handling of the class so that the different small sections would at the individual exercise work at different things, much saving of duplications might be effected.

HOW MUCH, HOW AND WHEN THE DENTAL STUDENT SHOULD STUDY ANATOMY.*

By Leonard C. Borland, M.D., L.P., Chicago, Ill.

The question of "how much" anatomy the student of the dental profession should have taught him seems to be one that has agitated the minds of both the student and the teacher ever since I have been teaching this branch, for the past twelve years. In fact it seems to the author that the most important question for any instructor to decide is "how much" of his subject those under his tuition should have taught them. One cannot accept one's own conclusions as to the amount necessary, with justice to the student, without having first placed them upon the tribunal of the judgment of all other teachers of the same subject; next, all the other teachers connected with the same institution in the other departments, and, finally, must take into consideration the *ultimate needs* of the student himself. From investigation it would appear that there is the widest difference of opinion upon this subject. Many of the teachers in the other scientific and practical branches of dentistry have not the slightest conception of the amount of scientific teaching used as the foundation in medical colleges. Nor do they in many instances even know the amount of these branches taught in their own institution. With a view of obtaining information upon the question of "how much" anatomy should be taught from which to form a composite opinion, the writer has placed himself in communication with fifty institutions in the United States teaching dentistry. As a result of the first inquiry only seventeen replies were obtained. A second and a third communication were sent out, with a final result of receiving replies from thirty-nine of the fifty institutions. The field covered, the manner of teaching, and the time spent were so variable that it was impossible to compile accurate statistics, although a great deal of valuable information was thus obtained from which it is possible to draw some deductions. They have been carefully preserved for reference and will be published verbatim should the society elect. In addition to the consultation of our own schools in regard to the matter in hand, we have also consulted some of the most prominent teachers of the three professions, to wit: medicine, law and theology, in regard to it. Further, members of the commercial pursuits were asked. To sum up briefly, it seems to be the generally accepted opinion that the dentist should cover the entire field of the fundamental scientific branches in a general way, with special attention to the parts in and about his future field of operation. If the position is tenable that the doctor of dental surgery is a member of the medical profession, and his specialty the structures of the mouth, and that he is of the same professional standing as the doctor of medicine who is a specialist upon the eye, heart or skin, then it seems apparent that the medical specialist upon the eye, etc., is taught a great deal of the unnecessary fundamental, scientific branches of medicine. On the other hand, the dentist as compared with him does not receive nearly the same amount of scientific foundational knowledge. That is to say, that the specialist in medicine upon the eye or ear has certainly received a large amount of unnecessary, impractical and useless training upon the anatomy of parts remote from the field of his work, as well as all the other branches of medicine. It is obvious, also, that the student of dentistry, having made the selection of his specialty at the beginning, is in a position to cut out all this extraneous teaching and confine himself to that portion of scientific, fundamental study which will best fit him for his future work. To substantiate the conclusions before mentioned that a student should study the anatomy of the entire body in a general way I beg to put forth the following reasons: First, from a medical standpoint, there is no line of demarcation separating the oral cavity and its contents from the rest of the body. It is but a part of the entire organism and whatever influences any part of it will necessarily be expressed in the mouth and teeth. The abdominal contents must be included because they contain the alimentary tract, of which the mouth is the beginning. Diseases in other parts of that tract are often expressed in the mouth and teeth. Maladies begun in the mouth or teeth are transmitted and expressed in other parts of the system. The blood vessels which supply the mouth and the blood therein contained are but transitory in the pulp of the teeth and in the floor of the mouth. The corpuscle in the inferior dental artery can in sixteen seconds be in the plantar artery of the foot. A capsule filled with potassium iodide, covered with a coating only soluble in the stomach, where, the salt being liberated, will pass through the walls of the stomach, be taken up by the blood current, pass to the parotid gland, the salt selected out and secreted, passes into the mouth with the saliva. The starch test will show the presence in the saliva of iodine in forty minutes after being swallowed.

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* Read before the Institute of Dental Pedagogics.

Carbolic acid injected into the gingival margin can be found present in the form of salicyluric acid in the urine in from forty to seventy-five minutes by Siever's ferric-chloride test. The nervous system of the teeth may, by reflex action, produce pain in the eyes, stomach, ears, or remote parts. Disturbances in other parts may produce pain in the mouth, or disturbances in the teeth. Impairment may be due to pathological conditions in the mouth or the teeth, or vice versa. Phlegmonous inflammation may extend from the temporal-maxillary lingual or facial veins to the internal jugular, thence to all parts of the body. General systemic diseases, as syphilis, tuberculosis, anthrax or malaria, etc., find their point of invasion in this region and transmission to other parts most remote, or, having been received in other parts, find expression in this part. Animals fed alternate months upon arsenic and mercury show a disposition of the chemicals in corresponding concentric rings in the long bones, which I presume is also true of their deposition on the teeth in a similar manner. Reasoning upon these facts the dentist would not be in a position to perform his full duty by his patient were he not able to recognize these conditions and treat or refer for treatment these lesions to the proper source from which they would find relief.

The administration of arsenic, carbolic acid or cocaine, anesthesia with ether or chloroform renders it imperative that he should know enough of physical diagnosis to ascertain that the condition of the heart is normal. I think that this knowledge is possible without rendering it necessary for him to go deeply into the differential diagnosis of the different heart lesions. That is to say, he should know the normal position and sounds of the heart, but need not know the difference between hyperthophy and dilatation, nor which one of the valves is affected. I believe the time is rapidly approaching when the dentist will be held responsible by the public should any untoward results take place after the administration of a local or general anesthetic, or the use of any of the toxic drugs, if it should be proven upon investigation that the patient had a pathological lesion that could have been recognized by an intelligent physical examination or an examination of the urine. Therefore, it is necessary for him to study the whole body in anatomy and dissection that he may distinguish the normal from the abnormal.

There seems to be an impression in the dental profession that the student of dentistry is spending far too much time in the study of anatomy, and far more than the medical student. In answer to this I beg to state that during the freshman year the medical student spends an average of 85 per cent of his time on the four fundamental studies of anatomy, physiology, chemistry, materia medica and therapeutics in comparison to only 30 per cent, the maximum time spent in the first year in our institutions, thus leaving a balance of 45 per cent to be devoted to his special study of dentistry.

As an additional argument for covering the entire field of anatomy in a general way, we may use a well-known practice in commerce, to wit: that of having an employe, who is to take charge of any special department in a factory or large commercial house, first to spend a short time in all of the various departments of that institution before entering upon a special field which he is to occupy in time. We might also cite the case of our brother profession, the law, wherein the young lawyer is required to get a good general knowledge of all branches of the profession before he takes unto himself a specialty. The fact that the profession of dentistry began as a trade and was practiced as such originally is no reason that certain members of the medical profession should insist that it must always remain so. Surgery, in ancient times, was not a part of the regular profession of medicine, but was relegated to quacks and charlatans for centuries, until its final development into a science entitled it to a position as a specialty of medicine. History repeats itself to-day in regard to the dental profession.

Is it not right to assume that *any art* having placed under it a sufficient scientific foundation to meet all the possible needs of that calling is entitled to a professional standing? Furthermore, is not it the right of the dentist to designate himself as "doctor" of dentistry, and be recognized as such by the public, based upon his knowledge of the scientific, fundamental branches of medicine, i. e., anatomy, physiology, chemistry, therapeutics and materia medica? Surely the cognomen "doctor" is not granted for expert mechanical ability.

It is based upon a knowledge of the science and not upon competency in the arts.

In Germany the profession of dentistry is divided into, first, "Zahn Arzt," or, literally translated, "tooth doctor," meaning a physician whose specialty is the teeth and the mouth. He has acquired the title of "doctor of medicine," and in addition spent the required time to become a specialist upon the teeth and mouth. It must, however, be noticed that, owing to the selective method which is pursued at the German university, if he has decided upon dentistry at the beginning of his course of study, he can select those studies which will be of the greatest benefit to him and only cover the others in a general way; *but he must cover them all.* Another class of graduates from technical schools receive their credentials as "Zahn Technicher," literally translated "tooth mechanic." Those holding the diploma of "Zahn Arzt" have naturally a true professional standing, and are permitted to use any drug or perform every operation allowed to any member of the medical profession. Those holding the latter are not permitted to use the term "doctor," nor any other professional title. In conclusion of this part of the subject I permit myself to draw the following conclusions: That the dental student should study and recite the entire human anatomy in a general way, with a special amount of time and study devoted to the mouth, antrum, pharynx, palate, nasal cavity, tongue, neck, brain, thoracic and abdominal cavity, upper extremity, lower extremity, genital and generative organs, gradually reducing the thoroughness of his studies on each of the parts in the order in which I have mentioned. It will be noticed that many of the departments of general anatomy have been left out as unnecessary to the dental student. For instance, perineum, articulation except the tempro-maxillary. Second conclusion, that it is very imperative that the institutions teaching the subject of anatomy to dental students should arrive at a uniform understanding as to how many hours of lectures, recitations and dissections shall be spent during the first, second and third years of their course of study, and that, having arrived at this conclusion, they shall demand from other departments of medicine (i. e., medical colleges) the standing which this will entitle them to. In medical colleges of the highest standing the time spent in the dissecting room is 240 hours: 60 hours upon the head and neck, 60 hours upon the arm and upper extremities and thoracic cavity, 60 hours upon the abdominal cavity, and 60 hours upon the perineum and lower extremity. If any dental institution is spending, for example, 150 hours in what the medical college is spending 240, then we should receive fifteen twenty-fourths of full credit in that department, and that upon the completion of the balance of ninety hours' work, we are entitled, and not before, to full standing in this department by such of our students as wish to enter the medical college. As is now the case the institutions teaching dentistry are unjustly in many instances asking for full credit in anatomy; and, on the other hand, the medical colleges are refusing to give any credit at all. All this might be avoided by reaching and publishing a uniform standard.

In this connection I cannot do better than to quote the words of the president of the International Commission of Education, Dr. Truman W. Brophy, in an address delivered by him before that body in Stockholm at their last meeting: "A mechanical training of the best kind is essential to the dentist and must form the basis of his future work. I would, therefore, strongly urge you not to imitate the education of the medical student, but to continue on the lines which will train a dentist for his own profession from first to last, and to have a single purpose in view, and to endeavor to obtain a definite result. Do not try to make a medical man a dentist, but let a dentist start and finish as such.

"Can this education be carried on side by side with that of the medical man, is the question of practical importance. I would unhesitatingly answer, No. The anatomist may train either, but he cannot train both together without giving one much more than he requires and not paying enough attention to the other."

Dr. Brophy, in another part of his paper, comments upon the definition of dentistry in the Ninth Revised Edition of the Encyclopedia Britannica as follows: "A special department of medical science embracing the structure, function and therapeutics of the mouth and its continued organs, together with their surgical and prosthetic treatment."

He says: "The above definition is, no doubt, as complete as any yet formulated and published in the English language. It by no means, however, covers the subject, nor conveys to the mind the full scope of the duties of a dental practitioner. Dentistry requires a broader definition than that. Strictly speaking, medical science constitutes but a small part of the modern dental curriculum."

From the foregoing it seems evident that the graduate does not get too much anatomy. Indeed, in spite of considering the immense amount of technique he must compass, the writer is of the opinion that he does not get enough general regional anatomy in dental schools where they maintain a separate dissection room. On the other hand, in dental departments of universities where they receive their instruction in common with medical students it would appear that their course of study is too exacting upon parts far removed from the oral cavity, with no special work upon the palate, antrum, nares, tongue, pharynx, etc.

The generally accepted meaning of the word "professional" among the laity, aside from the dictionary meaning, is one who has taken a thorough course of study and training, fitting him for all of the possible exigencies of that calling, based upon all the sciences having any possible bearing or relation to it, by an institution legally chartered by the government for that specific purpose. That dentistry is worthy of a professional standing, according to the foregoing standard, is not for a moment doubted by anyone who is familiar with the dental curriculum.

As to how the dentist should study anatomy, taking into consideration the fact of the immense amount of technical and special education that he must receive, and that his time is, therefore, exceedingly limited in which he must get his scientific foundation; it is, therefore, necessary to use every possible known means of facilitating his study.

The object of the teacher of anatomy in a dental college should be to give the student the largest amount of the most practical knowledge with the least expenditure of energy and time on the part of the pupil. It has, therefore, been my chief aim in the twelve years that I have been engaged in this work to use all of the known means, and to endeavor to find newer, better methods of teaching anatomy. With that end in view I first advocated the modeling of bones, muscles, arteries and nerves as a means of teaching, and carried it into practice ten years ago.

At the time I did this I was not aware, nor am I yet aware, that this method had been used previously.

HOW TO STUDY ANATOMY.

Didactic or lecturing upon descriptive anatomy is a waste of time as a general thing, and is being gradually done away with. The only thing that the lecturer on anatomy impresses his hearers with is the fact that it has been possible for him to have learned and repeated it, and also to teach the pronunciation of words. The bringing of a cadaver before the class is almost of no value to any larger number than can come near enough to see the structures that have been dissected, i. e., the distance at which one can read fine print.

Didactic teaching on any subject is only of value where it is necessary to show the manner in which conclusions are reached or comparisons made, or the giving of general directions as to methods to be pursued immediately, i. e., to teach the student how to study, what to learn, how to reason and how to draw conclusions. The taking of notes by the student is to a large extent a waste of time, for few can write and listen at the same time. The notes printed in the text book are better than any that he can take. Millions of reams of notes have been scribbled which I am sure are never again read.

The recitation method is more valuable, but it also has the disadvantage that while one student may recite the rest of the class may be dreaming about something else. Its main value is to ascertain that the student knows the subject that has been assigned in the lesson. The method of teaching par excellence is the manual or kindergarten method, in which all students are doing the same thing at the same time, to accomplish which each must know the subject and keep his mind on it all the time. In this method all the avenues of gaining knowledge are in use, viz.: touch, hearing, sight and comparison.

Taking into consideration the foregoing facts, I have endeavored to devise a system of teaching for the most difficult of all technical subjects, anatomy. The method is described as follows:

Osteology is taught by giving each member of the class the bone under consideration, together with two pounds of artist's modeling compound, obtainable at any artist's material supply house for about fifteen cents a pound, or common clay, such as is used in the manufacture of bricks. If used in the class room, the dough-moulding board of the housewife (cost about twelve cents each), upon which may be held Gray's anatomy, bone and compound while the student models; or in dental colleges the prosthetic laboratory room benches may be brought into requisition. The instructor may pass behind the student while modeling, and, as soon as modeled correctly, hear his recitation upon the same directly from the bone and the model. By returning this bone the next one is given him, and so on. I used this and advocated it as a means of class teaching in 1892. It is now in use in many of the larger universities throughout the United States. I would be pleased to hear if this method has been used before I devised it.

Myology is best taught by having the student model the muscles under consideration upon a skeleton, stiffly wired together for the purpose, as shown in my exhibit No. 1.

The modeling compound I devised for the purpose and perfected, after trying over 200 substances, which would meet with the twelve necessary requisites: 1, easily obtainable; 2, cheap; 3, of a consistency of muscle; 4, plastic; 5, color; 6, non-decomposible; 7, would not "wilt"; 8, would gradually set or become hard; 9, would adhere at the point of attachment and insertion, but not adhere to the other muscle; 10, not soil hands; 11, tenacious, so as to be drawn out; 12, not crumble. The formula for the modeling compound is: To thirteen ounces of water add one teaspoonful of carbolic acid, bring to a boil; ten grains of carmine, and gradually stir in one pound of rye flour; when mixed remove from the fire and knead in ten drops of oil of cloves.

Arteries, veins and nerves may be added to this model by means of No. 20 telephone wire in red, blue and yellow colors, obtainable at electric supply houses.

Ligaments may be modeled perfectly by dipping absorbent cotton in glue and pasting them on the bones.

The muscle-modeling compound forms an excellent substance for modeling the brain, by which it is possible to give a better idea of the relations of the various parts of the brain than by any other means I have ever tried.

After having pursued the foregoing methods the student is ready to begin the actual dissections of the human body. Owing to the difficulty of obtaining material in many locations, some colleges are obliged to dispense with the dissections of the human body. In that case some of the lower animals may be used to great advantage, as the dog, cat and pig, or the modeling method described may be used.

DISSECTING.

It is of advantage to apportion out the work of dissection into a definite number of regions or parts to be dissected simultaneously by the largest number of students possible. In this manner they will have the advantage of seeing many times the structure under dissection. It is also desirable to have each make a drawing of the parts to be dissected before entering the room. I have prepared a set of thirty outlines, embracing the entire human body, in which the student may fill in the muscles with pink, color the arteries red, veins blue and nerves yellow, with either water color or pencil or colored crayon.

As far as possible a dotted enclosure is left upon each structure, wherein the student is to fill in the name thereof. Drawings of each region occupy the student's time from one to four hours each. Nearly as much knowledge can be gained by filling in and coloring one of these outlines, which only occupies his time for fifteen to thirty minutes, as by making an entire drawing. The portioning out of the day's work and giving a list of the structures to be found in that region, together with some brief instructions and cautions in its dissection, have also been printed upon the outline accompanying the system. After the student has dissected the region in question he should be quizzed, his paper collected and a mark given averaging his drawing and dissection. This method has the additional advantage of making each student find each structure in the region and cover the entire field. It also does away with the slashing and cutting away of material and throwing it away, which is frequently the case where no attempt is made to check the student's work in detail. It is of satisfaction to the student to know how he stands on each day's work, and is usually a stimulant for him to do good work.

WHEN SHOULD THE STUDENT STUDY ANATOMY?

It is advisable to devote during the first half of the freshman year, or three months, four hours to the recitation and modeling of bones and articulation. During the second half of three months, four hours each week to the modeling and recitation of muscles. During the first three months of the second year, to the modeling of arteries, veins or lymphatics, two hours once each week. During the second half of the second year, or three months, to the brain and nervous system, four hours once each week. The dissecting should be done during the first month of the first, second and third years, four hours each day, five days each week. First year upon the abdominal cavity and lower extremity; second year upon the thoracic cavity and upper extremity; third year, head and neck. During the time the student is engaged in the dissecting room he should not be permitted to do any work in the dental infirmary. It is advisable to have this work gone over as expeditiously as possible, owing to the perishable nature of the material. Also to have it out of the way so that he may have his hands in condition to do work in the mouth for the other five months of the three years.

EXHIBITS.

1—Bones of the vertebral column modeled by freshman class during the first six lessons.

The object of this exhibit is to show the progress made during that short period.

2.—Seventeen hundred drawings of the *ten regions* covered by *175 members* of the *freshmen* during one minor (sixty hours) in dissecting room.

3.—Thirty-six hundred drawings of the twenty regions of the upper extremity, head, neck and thorax and contents, showing drawings of the *special regions* covered by dental students, not usually included in the course of the medical students, were made by 180 members of the junior class during one major (120 hours), in five weeks, twenty-four hours per week. Some students can accomplish this in eighty hours.

These drawings and demonstrations are intended to indicate the *special fields covered.* They are suspended above the dissecting table while the work is being done, and are used for reference by the students. The making of these drawings prior to the doing of the work forces the student to spend some study on the dissecting before entering the room. It relieves the monotony of studying the text and reciting like a parrot, and helps to retain the knowledge and teaches the relations of the parts. Each student receives a mark on the drawing, one on his dissection, and a third on his recitation. These three are averaged together and given as a final mark for this region. It seems to be particularly satisfactory to the student to feel that he has accomplished this much and has it behind him. No final examinations are held for the reasons previously stated.

PRACTICAL DEMONSTRATION NO. 1.

The modeling of bones with plastic compound in the manner pursued by the students, showing compound, modeling tools, board, etc.

PRACTICAL DEMONSTRATION NO. 2.

The modeling of muscles upon the skeleton.

PRACTICAL DEMONSTRATION NO. 3.

Modeling of arteries.

PRACTICAL DEMONSTRATION NO. 4.

Modeling of nerves, brain, etc.

PREVENTION OF DENTAL DISEASE.*

By Lucien H. Arnold, D.D.S., Chicago.

I wish to concentrate attention on an old fact with a new significance, and I base my argument on an axiom which is accepted by all, I think, without question. It is this: "A perfectly clean tooth in normal surroundings *can not* decay." I do not mean a tooth having a thinner coating of deleterious matter than another, nor do I mean a tooth that has been cleaned *at*. When first the writer realized the great importance of thorough cleaning, he began to give it more care and study—and the more study it received the more it seemed to merit; till now, cleaning the mouth occupies a large portion of his time. A perfunctory cleaning once in a while is not the complete duty of a dentist to his patient in that direction. Neither is a penetrating, painstaking cleaning once a year enough to prevent disastrous results. If a tooth be as clean as our present skill can make it, how long will it remain safe in the mouth? A year? Certainly not. A month? No. A day? Hardly. How long then? Not longer than it takes that tooth to receive enough flotage to harbor an acid producing microbe.

That is the theory.

Practically the time a clean tooth may safely be left to the care of the patient depends on many things. The writer has one patient for whom it is necessary to go over the teeth, at present (and has been for months) every week. An extraordinary case (since been reduced to once in two weeks). Others go two months—rather too long. In general, a practical time is a month.

Patients have a regular day and hour set apart for them throughout the year and come in to have their mouths cleaned much as one has his hair cut.

If our teeth were now being used as they were designed to be, such extreme attention might be needless, but as long as man eats soft "breakfast" humbugs and finely ground flour and artificially tender flesh, and subjects his teeth to abnormal extremes of temperature, just so long all our intelligence, reason and skill will constantly be needed to keep his masticatory apparatus serviceable. Can there be the least question as to the greater desirability of *preserving* from disease the tissues of the mouth, rather than standing helplessly by and waiting till disease, thoroughly established, has reached a presumably convenient stage for efforts at interference?

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*Read before the Chicago Dental Society, June, 1903.

There *is* no question whatever and the reason all do not follow the practice I advocate is because of the habitual slight the profession at large has so long put upon cleaning operations.

The process is old; you all are so familiar with it that I will mention only the cardinal necessities:

First. Always go over the teeth—especially under the free margins of the gums—with appropriate instruments and remove every vestige of accumulations.

Second. With the rubber cleaning cups and plenty of fine pumice paste, go over all the accessible surfaces of all the teeth and polish off the particles too small for the scalers to remove.

Third. With the moose-hide points moistened in pumice paste, polish the lingual surfaces of the incisors.

Fourth. With the bristle disks, still using the pumice, polish, as far as possible, the proximal surfaces of all the teeth and the occlusal surfaces of molars and bicuspids, reversing the direction of rotation frequently.

Fifth. With the dental floss and pumice carefully polish the remaining portions of the proximal surfaces, not neglecting the sub-gingival portions.

Sixth. Inject into the inter-proximal spaces three per cent solution of dioxide of hydrogen and with the solution still in the mouth massage the gums firmly.

Seventh. With a flattened orange-wood point and pumice polish every spot missed by the other instruments.

Eighth. With tepid water give the whole mouth, spaces between the teeth, mucus folds and all a good liberal bath and rinsing.

These eight are the vital points and are to be elaborated as each case demands. Now what is gained by all this? Well, keeping the teeth perfectly clean prevents decay.

Preventing decay prevents the necessity for filling and its attendant pain, "re-currence," "extension for prevention," as well as most of our uncertain root work, together with "crown and bridge work."

Preventing pain and uncertainty adds to our reputations and our lists of patients.

Preventing decay and painful filling makes extraction needless, and so forestalls the need of foul bridges and plates.

Preventing the accumulations on the teeth prevents putrefaction and so we have always a sweet, wholesome mouth free from sickening odors, and pyorrhea alveolaris with all its filthy train of sequences including some forms of indigestion, infections of the intestine and sometimes of the general system as well.

The constant polishing soon gives the teeth that healthy, transparent, live look indicative of a healthy saliva, long tooth life, lasting fillings, and general absence of oral disease.

Patients can, therefore, be honestly assured nearly total immunity from dental and gingival disease. Restorative procedures will be largely lessened if this scientific prevention is consistently carried out.

Begin with the little children. It is the best possible practice for them as it allays fear, causes no pain, requires no long sittings nor nasty rubber dam, and at the same time educates the child into regularity of habits and attention to the mouth, supplies the infantile gums friction necessary to promote expansion for reception of the large permanent teeth, thus preventing much irregularity and mouth breathing with its inspissation of mucus and the consequent oral and possible systemic infections to which these conditions are known to predispose.

It must reduce the percentage of death from the disease of childhood and certainly will inculcate habits of the mouth which will last through life and by removing previously mentioned debilitating possibilities, help build a race of healthy, rugged, well nourished men.

Gentlemen, the considerations set forth are too grave, too far-reaching, too important to your patients and to our standing as a profession to be longer neglected and must have your prompt and thorough adoption.

MEDICATION AND OVER-MEDICATION IN THE PRACTICE OF DENTISTRY.*

By A. E. Morey, D.D.S., Chicago, Ill.

Medication is the application of a therapeutic agent in order to produce some specific modification in the structure or function of the organism, and is based upon certain fixed, scientific standards, both for the exact preparation of the drug in strength and for its normal action upon the animal tissues.

Empirical medication is the employment of drugs or combination whose therapeutic actions are based upon clinical experience only. In the application of drugs to pathological conditions the dentist has a great opportunity for the exercise of individual skill in bringing about a normal or an improved condition in the deranged structures or functions under consideration and upon the completeness of diagnosis and the nicety of the adaptation of treatment rests the value of his operations. Many opportunities are also found by the conscientious dentists to prevent trouble, and in so doing perform even a greater service to mankind than to find remedies and apply them.

We have been reminded many times that brains play a most important part in the application of drugs as they certainly do in any department of life's activities. We have the conservative practitioner who would treat the entire field with two or three drugs and combinations; also the other extremist who would find a peculiar therapeutic adaptation for the thousands of varied agents, old and new, which constitute a bewildering maze. He who is forever "trying a new thing on the dog," if, forsooth, he does not try it on you and me. Certainly both kinds of these workers establish facts for us to think about.

One investigates every phase of chemical and therapeutic action and stimulates our interest in those fields, while the other looks to nature's repairative activities the more and insists upon general principles and tried conditions. We often suspect the latter of not being quite up-to-date in our enthusiasm for novelties, yet now and again he calls us back to prove our work in a practical and scientific way.

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*Read before the Chicago Dental Society.

Over-medication indicates a dentist's mistakes, either through ignorance of chemical and therapeutic qualities of drugs, or incapacity in their application, or through misjudgment of the requirements of the case in hand. It is from the records of these errors in practice that we all wish to study out our reforms, and the drugs with which we over-medicate, I think, always the more potent ones, especially irritants and escharotics, whose employment sometimes leaves the last condition of the patient more deplorable than the first.

The surgeon says "remove the cause, etc.," and the intelligent dentist seeks, by medication in this case, to remove the cause of infection and irritation so that nature may re-establish normal conditions, but when he over-medicates he often destroys valuable tissues which he cannot replace, or creates a condition that becomes a chronic nuisance.

Mal-application of drugs is so common that all have seen the results, i. e., necrosis from injection of powerful escharotics, or destruction and sloughing of soft tissues from drugs incompletely sealed, i. e., arsencous acid badly applied or local anaesthetics, etc., or sometimes an increased area of infection by the inefficient application in closed and partly closed cavities of effervescing remedies, such as peroxide of hydrogen, or pericemental inflammation from the use of irritants in roots of teeth, or chronic "soreness" and "lameness" of roots from the sealing of too powerful escharotics within them.

Again these agents may be applied too frequently, thereby maintaining an irritation which is wholly unnecessary, or a constant interference with nature's healing processes is kept up which produces finally a difficult condition to overcome. This is especially noticed in root treatments, pyorrhoea and antral cases.

Excessive dosage is perhaps not so much an abuse in our department of medicine as in others, but we do see the toxic effects. Salivation by mercury and, in the misapplication of such drugs as aconite, belladonna, cannabis indica, cocaine, morphine and many others having marked systemic effects as well as local.

The repeated application of the same drug in the same or allied forms may bring us trouble by accumulating in the tissues until marked toxic effects are exhibited. We are sometimes misled by extremely sensitive patients into repeated applying arsenic and the dental pulp, so much being absorbed and so ineffectually counteracted as to produce unnecessary inflammation; or such drugs as carbolic acid, sulphuric acid, oil of cassia, are applied in excess in this way. Another case is that of the chronic mouth wash user. A mouth wash has probably been prescribed for some specific purpose, and the patient pleased with taste and stimulating effect upon the gums acquires the habit, or is led to "harden" their gums, so to speak, with some one of the nostrums so widely advertised and in consequence produces chronically inflamed mucous surface or one whose functions are in large measure inert because of the gradual absorption of irritants.

It sometimes seems as though there was too great a tendency to employ drugs in cases where we should persevere in a little more patient manipulation, pasting into roots mixtures to mummify or quietly dispose of pulp remnants, placing extra large doses of powerful drugs in teeth with the vain idea of keeping conditions antiseptic for a considerable time, with the resultant chronic soreness and tenderness or prescribing patent nostrums instead of well chosen remedies that fit the case in hand.

These practices are not worthy of us as a profession and should never occur except perhaps in meeting unusual conditions and emergencies; on the other hand, some of the workers in our profession are experimenting constantly and demonstrating the use of non-irritating germicides, giving us new forms of drugs with the exact potency under given conditions, and when used upon different micro-organisms; so that there is little excuse for some of these errors in over-medication. The societies are trying to wean practitioners away from methods which have been proven untrustworthy, and the colleges to teach their students more and more the scientific methods.

The X-Ray, the probe and the knife give medicine very satisfactory assistance where there is doubt about existing conditions, and so we may expect good progress in the future for applied dental medicine.

REGULATING PLATE CONSTRUCTION SIMPLIFIED.*

By E. Bradner White, D.D.S., London.

Mr. President and Gentlemen:

As the subject of my paper implies a curtailment of labor, you will naturally expect brevity in its elucidation; in which I hope not to disappoint you.

Those of us who include orthodontia in our practice have, no doubt, tried all of the known and probably some unknown methods for its accomplishment; and I feel justified in saying, though it may seem a sweeping assertion, that we have all reverted to the old but positive method of employing plates for the regulation of teeth.

We are indebted to many eminent men for valuable ideas on these lines, but the tendency has always been toward complication rather than simplification in construction.

It is more often than otherwise a difficult matter to adjust a spring or place a screw, so that when the plate is vulcanized, the pressure is just where we would wish it. It is, therefore, the object of this essay to define a new method of rendering the attachment of springs, screws, hooks, levers, wires, etc., to vulcanite regulating, or retaining plates, at once simple, easy and accurate.

To illustrate my remarks I have a few simple plates fitted with springs to produce pressure from various directions; and it will be noticed that *no attachment whatever* is vulcanized into the plate. This is my system and from its extreme simplicity and ease of manipulation, requires but little explanation.

The first requisite is the plate; and if there are no strengthening wires necessary, the waxing up can be done ready for the flask in five minutes, no matter what form the plate need be.

It is only necessary to bear in mind that when finished, the plate must be about a line thicker than if the springs are vulcanized in, the reason for which will be obvious as the subject progresses.

The next step is the shaping and attachment of springs, etc., as the case requires. For rotation, moving backward or forward, depression, elongation of teeth, narrowing or expanding the arch, the operator may use any springy wire he chooses, but for all purposes except expansion, or retention, I use and would recommend gilded piano wire, size A, English gauge.

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*Read before the American Dental Society of Europe, Madrid, Spain.

The gilded piano wire is most satisfactory in this method as it does not corrode and in many mouths does not even tarnish, which is not so if vulcanized in, besides being, in the size mentioned, exceedingly springy and easily worked.

For a Coffin spring, a heavier size is necessary. For retaining cribs I use either gold or dental alloy.

The attachment of the springs, etc., to the plate is the chief feature of my system, and for the purpose, only two instruments are needed, viz., a drill for making holes through the plate, a trifle less in diameter than the wire used, and a pin hole punch with the ends of the beaks slightly modified, for compressing the wire tightly to the plate.

The spring is to be shaped leaving the end which fastens to the plate, projecting about ⅝ of an inch beyond where it is to be attached. Two holes are then drilled through the plate as before noted, from ¼ to ½ an inch apart and in line with the direction of the wire; with a bur a groove sufficiently deep to receive the wire is made between the holes on the palatal side of plate, so that that surface will be level when the wire is in place.

The plate end is then threaded through one hole from lingual side and back through the other, and with the before-mentioned punch, compressed at the holes until the angles firmly grip the plate, thus rendering it a fixture. This, as will be readily comprehended, is extremely simple and rapid.

If a spring has accomplished all that it is capable of doing after repeated bendings, the pressure can be renewed by simply changing the direction of one or both of the holes and inserting a new spring, during the visit of the patient, and all by using the same plate, which, if it has been made a good thickness and vulcanized to a high degree of toughness, may be used for carrying springs until it is perforated all over

In fact, nearly always, except for expanding the arch, one plate by my method, with a change of springs, etc., to meet the exigencies of the case, will correct the deformity.

A plate for expanding purposes that is sawn down either side instead of through the centre, may have a Coffin spring attached in the same way.

For a retaining wire after protrusion, one hole for each end will suffice.

I consider a plate simplified as it is in this way, more satisfactory than complicated fixed devices. It is more cleanly and the ease of construction renders regulating a delight rather than a nightmare.

The method of adjustment as here described has spheres of usefulness in other ways; as, for example, a tooth may be temporarily added to a plate where a crown or bridge is to replace the plate, when a tooth has been excised leaving a space. In this way the gap is filled quickly, and without vulcanizing or soldering.

Also to place a clasp on a vulcanite plate. However, these matters are beside the purport of this paper, and the resourceful operator will find the application of this method useful in a variety of instances.

CEMENTOSIS, PERICEMENTOSIS AND EXOSTOSIS.

By Dr. G. Alden Mills, New York.

We shall not give the etiology of these pathological manifestations, but bring to the notice of thoughtful men the bearing of already published teachings that to our mind are pointing us to an intelligent explanation of these manifestations. From the time of Dr. Bödecker's publication of his investigations of pulp tissue, we have had a fixed theory that these subjects have not been given the attention they demand. Just how early these pathological conditions may commence has not yet been indicated by anything published, so far as we know. It is conceded that the pulp is the tooth-former. That we may have a typical tooth we must demand a normal condition of the pulp. Is this so to any large degree?

Dr. Bödecker's teachings show a large percentage of abnormalities, and to account for these it is reasonable to assume that both constitutional and local disturbances affect the functional operations of pulp action. This we believe, may or does, take place in the earliest development of tooth-structure.

Here we contend again for the encouragement of Dr. Smith's theory of "Root-development" as given in the September number of the Independent Dental Journal of 1901. Without hesitation we see an intelligent reason for emphasizing the truth of the Doctor's theories.

Based upon both constitutional and local disturbances there may be formed an excessive development of Cementosis or Pericementosis. This may occur both from deficiency of gum stimulus and overstimulus of pulp tissue. It is made plain to us as we now view things, why it is frequently seen that one side of a root will be deeply involved with pericimental disorder forming a deep pocket and this, the only root in the entire dentition that is disordered. From our present knowledge acquired by observation and practice we see where we could have successfully arrested in the early days, some difficulties caused by Cementosis and Pericementosis; by cutting off the cause—the pulp—and removing the disordered cement. We recall a case of decided interest almost at the beginning of our practice.

An upper central had begun to show decided elongation. We did at the time what was taught, viz.: grind off the elongation, only to see it again elongated in a short time. We followed that case till the tooth was ground so much that the form of the crown was almost gone and the pulp also. To-day we would quickly devitalize the pulp and remove the excessive cementosis and arrest the disorder.

A microscopist in the south, I do not recall his name, showed conclusively the malformed deposit or formation of "decalcified cement," which led Dr. Smith to introduce his method of dealing with the disorder.

Both of these men have verified what the late Dr. Riggs held in theory and put into practice. He often said to us that were he young, he would take up microscopical study and prove his theory. He spoke of the "glossy or vitrified" conditions he found on portions of the roots of teeth and urged that we should be persistent in removing it, until we reached the "velvety" feel of live tissue under the touch of the instrument, which by practice becomes familiar to the delicate sense of touch. We are convinced that there is a call for far more definite study in the field of neurology applied to pulp disorders, influencing as they surely do the origin of these pathological manifestations that we have given as a text for our subject.

As we become more intelligent in this field of study, it will be made plain that there is a field of "preventive practice" that will not be so languidly noticed as it is at the present day.

PROCEEDINGS OF SOCIETIES.

INSTITUTE OF DENTAL PEDAGOGICS.

Discussion on Dr. Borland's Paper.

Dr. F. D. Weisse, New York:

The work of Dr. Borland in schematic demonstrative anatomy is most unique and original in all its details, and stamps him as possessing an artistic sense possessed by few, and makes the possessor a born teacher who loves his work and enjoys dispensing the fruits of his gift.

In my experience of all professors in medical and dental institutions, I have met but one other man who possessed the peculiar endowments of Dr. Borland. That was Prof. Gilman Thompson, formerly professor of physiology in the Medical Department of the University of the City of New York; now Professor of Practice of Medicine in the Medical School of Cornell University. His work was in models, illustrating physiological phenomena, which are still extant, they being now obtainable from Ward of Rochester, New York.

I am surprised at the drawing capabilities of Dr. Borland's students, as shown by the reams of drawings exhibited. These drawings are unmistakably great aids to the acquirement and fixation by students of a knowledge of the parts which they are to recognize in their dissections. But I had no conception that our students possessed such an universal ability to draw. I always advise every student to take up free-hand drawing as one of the studies of his preliminary education, because so many students find difficulty in drawing the objects on the slides in the histological and bacteriological courses. The specimens of modeling of bones are revelations of the possibilities of endowing the "Dry Bones" of past anatomy with interest and life. The muscle modeling and attachments and the vessel and nerve inclusions are most ingenious, gross reproductions of nature, well calculated to lead the student to a thorough knowledge of the subject. I would commend most highly his dissecting room methods of having all students dissect the same part at the same time. Also having a drawing of each section suspended over the table while the work is being done. With regard to the value of recitations on anatomy, it is a lifeless—to quote the essayist's words—"Expenditure of energy and time on the part of the pupil," as compared with results obtained by time spent with other methods. In brief, I have naught but commendation of this method of schematic demonstrative anatomy, and would tender my congratulations to its originator on the possession of a gift which combines the deft of both sculptor and artist. I would especially emphasize the thought of the essayist by repeating it that we may all remember it: "The object of the teacher of anatomy—the same is true of the teacher of any department of the curriculum—should be to give the student the largest amount of the most practical knowledge with the least expenditure of energy and time on the part of the pupil." As the subject of this essay is "Teaching of Dental Anatomy to Dental Students." I think it may interest the representatives of dental institutions and a few teachers of dental anatomy in dental institutions that are present at this meeting, to call attention to how general anatomy is taught the dental student at the New York College of Dentistry.

We have always held with the author of the paper that the dental student should be taught the anatomy of the entire body. We divide the subject between the department of anatomy proper, and the department of physiology. The department of anatomy, developing the regional anatomy, locating all organs, including the viscera; while the department of physiology develops the special anatomy of the viscera, the chair being called "Physiology, Viscerial Anatomy, and Histology."

Experience of the past thirty odd years has proven this division of the work as most advantageous to the student in his better acquirement of both the anatomy and physiology of the organs, the anatomy of the organ directly preceding its physiology. This division also affords the professor of anatomy more time to develop the regional relations of the organs of the several subregions of the body. Anatomy must be taught in one of three ways: first, from the cadaver; second, by every possible schematic aid that may be devised, for facilitating the student in finding and recognizing the several parts as he dissects; third, by didactic lectures, with selected sequential reproductions of nature, so enlarged as to be instantly realized by all the auditors before the lecturer. Much has been said of the uselessness of didactic lecture teaching as compared with dissecting room and laboratory work. Where the question of technic is the knowledge to be acquired, this may be the case in a large degree, but there is a vitality that is imparted in the dispensing of knowledge by the human voice—when it is impelled by a complete knowledge of his subject by the lecturer—and when it is enthused with the magnetism of the enthusiasm of the true teacher, —which commands the attention and makes the minds of the auditors receptive of the subject matter being taught.

It will be a long time before the human voice will be silenced as a medium of imparting knowledge by exclusive laboratory teaching. The appreciation by the organs of hearing should be assisted by the organs of seeing; in grasping the trend of the lecturer's words. Did you ever think that if knowledge is received by hearing alone that each side of the head presents a hearing hole? It too often happens that the knowledge goes in one hole to come out the other; but when knowledge enters by the pupil hole of the eyes, it is more apt to be retained, as there are no holes at the back of the head for it to escape.

Now, I wish to show you the method I have resorted to for over twenty-five years, to illustrate my didactic lectures on anatomy. I must say here that I consider prepared dissections as aids to illustrate didactic lectures as useless for purposes of demonstration to audiences of over ten students. I have to plead guilty to being the author of a book on "Practical Human Anatomy," which is illustrated from my own dissections of the entire body. These dissections are arranged sequentially to display the complete anatomy of a given region. I have had lantern slides made of these illustrations, and one of these is always on the screen as my lecture progresses. My object is to evolve as

I progress, a verbal description of the region which appealed to the hearing at the same time that a pictorial verification of the description is demonstrated for the appreciation of the scene. In this way I can effectively impart the knowledge of the subject to auditors by the hundred. After the student has listened to the lectures, the volume of illustrations becomes his text book, which he can study and he can take it to the cadaver, prepared to recognize what his dissection develops, and thereafter—having found that the illustrations are true reproductions of nature—the volume becomes to him a *vade mecum* which ever reminds him of his dissections. The kindness of your executive committee in obtaining lantern facilities for me, enables me to exhibit to you some of these sequential dissections for illustrating didactic lectures on anatomy, which are within the reach of all lecturers on anatomy and where dissecting materials are not abundant, they can, in a great degree, compensate for it. This I know to be a fact, as for several years the dental institutions of the state of New York could not obtain dissecting material under the anatomy law, and these slides were my only aid in teaching anatomy, and during those years, my students acquired a knowledge of anatomy therewith.

(Here followed exhibition of lantern slides of sequential dissections of face and thoracic subregions.)

Dr. Wm. C. Barrett, Buffalo, N. Y.:

I am not a teacher of anatomy and therefore am not competent to discuss this paper. However, Dr. Borland is my associate in the faculty of the Chicago College of Dental Surgery, I am acquainted with his work and believe that I have cause to congratulate you upon having listened to this very excellent paper, and myself for having him as a co-laborer. I merely wish to verify what he has said.

Dr. A. O. Hunt, Omaha, Neb.:

I will not take up your time for more than a moment as I wish to refer to only one point mentioned in the paper, and that is the use of the blackboard and chalk. I am fully satisfied from experience that the very best of models and charts do not impress upon the mind of the student so clearly and so quickly what you desire to have him know as a thorough and liberal use of the chalk, doing this at the time that you are delivering your lecture. This method has many advantages; the principal one is that while you are working the student's interest is naturally directed to what you are doing. He is bound to follow you in your work. Some will say that only a few men can do this, but I am inclined to believe that more could if they would only try it. It is not a difficult matter to make an outline drawing: it may not be absolutely correct, but it is sufficient to convey the idea of what you are talking about, clearly, quickly and concisely to the student.

(I wish to offer a motion, if it is in order; Dr. Borland is not a dentist, although a teacher in a dental college; he has come among us, giving us his methods of teaching, and I move that a vote of thanks be extended by this institute to Dr. Borland for his courtesy. Motion was carried.)

Dr. W. H. Whitslar, Cleveland, O.:

The essayist said that the didactic teacher should also teach proper pronunciation. I therefore arise to say that in the pronunciation of the word anatomy, it should be an-at′-o-me and not a-nat′-omy.

Discussion of Dr. Black's Paper on "Teaching Applied Physics."

Dr. Geo. H. Wilson, Cleveland, O.:

I am sure that it has given us all a great deal of pleasure to listen to this very excellent paper. I must say, however, that I feel that I am somewhat unprepared to discuss it because it so happened that the copy of the paper was not placed in my hands until after I reached Chicago. We all appreciate that Dr. Black is a very competent man; his shoulders are broad in many ways, and, perhaps, this is not a bad time to hit others over his shoulders at the same time that we hit him. The more valuable the paper, the greater the necessity of placing a copy in the hands of the discussers before the time of the reading of the paper. If the copy is not given you until after you reach the place of meeting, I think you will agree with me that there is not time enough to prepare a discussion which would do justice to both the essayist and his discusser. It is impossible for me to go into an extensive discussion under these circumstances, and yet there are so many points in the paper on which I wish to touch in passing that I think I can give you enough on the subject without having had any preparation.

So far as most of the paper is concerned, I do not wish to consider it. It speaks for itself. The various appliances which the doctor presented and exhibited also speak for themselves. But there are some principles that underly it all on which I wish to speak. As to the question, whether or not physics should be taught very extensively in our dental colleges, I do not like the term physics at all. It is really a word of modern coinage. Some twenty or thirty or more years ago, when some of us were attending school, we called this particular science "natural philosophy," and I have noticed that there is a disposition to go back to that term again at this time. That term is a vastly better one than "physics"; it conveys more of an idea to our minds; philosophy—the reason for things, of natural things or natural phenomena. Surely there is no one present who would question the usefulness of the study of natural phenomena in dentistry. In fact, we might go so far as to say that in dentistry there are but two subjects which are required for a foundation; one is natural philosophy and the other is physiology. These two studies in themselves form the real foundation of the whole subject of dentistry. If we are going to understand dentistry we must study fundamental principles which are involved and we find these in physics and physiology. All the other studies are developed from these two.

It has been said a number of times during this meeting that the great idea of our dental teaching is to make dentists. That is correct, if we have the correct idea of what a dentist is. We do not understand that when the student goes out from the college he is as perfect a product as he will be when he has been out five or ten years. In order to turn out such a dentist it would be necessary that we place the student at the chair as soon as he enters college and keep him there until he goes out at the end of the third or fourth year, and even then, perhaps, he would be only a moderately good operator. But it seems to me that there is something more than that necessary, and that is for us to lay such a broad foundation for him that he can in time develop into a good operator. I believe that when a man has been properly taught, and has been given the practice of inserting from a hundred to two hundred gold fillings and such other operative work as is demanded of him, that he has as much practice and experience and training as it is possible to give a student during his three or four years at college. If he has not acquired the knowledge he should have, then he should be required to take a part of his work over; he should not be retained in the regular course of study.

So I say for that reason the mere ability to fill cavities and do other operative work is not the making of a dentist. We want to give him a good, broad, liberal education. How can we do it? First, by enabling him to make use of his knowledge to become a dentist; give him a knowledge of the literature of our profession and enable him to use it correctly. A man with a good, broad education must be able to think and draw conclusions; and in dentistry he should have that power. The great object in teaching dentistry is to enable the man to do something. The dentist should not expect to be able to render the same service to his patient when he leaves college as he can after he has had years of experience. I do not believe that any patient expects that. If they did what would be the value of the many years of experience that we count so much on? If they did, there would be no reason why the man just from college should not be entitled to the same compensation as the man who has had twenty or thirty years' experience, and whose work has received recognition.

If a man has great ability and is a leader in his profession, it means that his foundation was well laid. At the same time, if there is a time in a man's life when he can lay a good foundation it is during his college life. If he fails to do it then, he never will.

As a teacher I want my students to have a broad foundation in school. I know of no way to illustrate this better than to speak as a father. I have a son who entered college this fall, and the method I am pursuing with him would, perhaps, express my feelings better than anything I could say at this time. I expect that he will apply himself for, say, three and a half hours a day at the dental technic work; that is, prosthetic, operative, etc. Then, in the latter half of the term he will have the practical work; plate work, crown and bridge work, operating, perhaps, for about five hours a day. The rest of his time I will expect him to devote to the scientific part of his work, laying his broad foundation. Now, what will he do during that time? I will say that it will be largely laboratory work of one kind and another, especially in the physical laboratory, which should be the important part of the work. But I believe that, on account of the great cost and the delicacy of construction of the various appliances used in this work, that it will not be practicable to place them in the hands of the student to use by himself. It should be more of a demonstration course, the instructor carrying on the work and demonstrating to small sections of the class so that every student can see and carry off the idea of what is done and what it is done for. I think that they could acquire the necessary knowledge in less time when the work is done in that way than if they could use the instruments themselves and work out the course individually; this would also consume a great amount of time, more than they have at their disposal.

There are other branches of laboratory work that I feel are fully as important as the course in physics. Take, for instance. the use of the microscope in histology. This work will be done during his first two years in college and will consist of the mounting of a hundred or more microscopic sections. That is fine manipulative work, work that requires exactness and the careful consideration of details in every respect. It is a means for cultivating honesty and truthfulness. If he is not honest in preparing his slides, his work will show it in the end. So that in selecting work for the student it should be done with a view that it will develop manipulative ability, and the power to think logically and to draw conclusions, and then I believe we will have men who are better dentists than we had twenty or thirty years ago.

In the case of my own son, I believe that he can to-day, although in college less than a year, do more artistic, more ideal, better work in prosthetic dentistry than I could after I left the dental college with four and a half years of preparatory work. If he has that better foundation and ability, it is because of the different method of training he has had. I am firmly convinced that we are producing better dentists to-day than we did twenty or thirty years ago. So that as we enter upon the four years' course in our dental schools, I trust that it will be our aim to put in as extensive a course in physics and other laboratory work as possible, because I believe that it is a great source of instruction. There are other departments of physics that the student should be instructed in, but it need not necessarily be laboratory work; it can be taught in the lecture room accompanied by thorough demonstrations.

Dr. Black has confined himself almost entirely to the application of power, of force. I believe that they should also receive considerable instruction in the physics of light. If the members of the dental profession had more knowledge of that subject to-day, we would not hear so much discussion about the different ways of putting in inlay work; whether it should all be of one material or of different layers, or of different qualities of material. Some materials which are highly recommended would not be considered at all because they would appreciate the effect of light on the inlay.

So I believe that the principles underlying physics or natural philosophy should be more thoroughly taught in our schools. Of course, the laboratory method of teaching is much slower than the didactic work, but a portion of the time could profitably be put in in the laboratory and then the teacher could fill in by thorough demonstrations in the lecture room so that the students would get a complete course, one which would be of considerable value to them in their career as dentists.

Dr. J. P. Buckley:

It is with a degree of reluctance that I attempt a discussion of this very elaborate and comprehensive paper, for I am not a teacher of physics, except that in teaching chemistry, which pleasure I enjoy, it is necessary, oftentimes, to consider the subject of physics, as the two branches of science are very closely related.

We are fortunate at this time, I take it, in having this subject presented by so thoroughly competent a teacher as our essayist.

Few men, indeed, in our profession have spent as much time applying physics to dentistry as has Dr. Black, and as a result of this application he has made many valuable discoveries, which have greatly benefited the entire dental profession.

Before we can enter into an intelligent discussion of the subject of teaching applied physics, it will be necessary, first, to know what is included in general physics, and then decide upon the special subject to be treated in our applied course.

General physics is a science which correlates with algebra, geometry and chemistry. Its correlation to chemistry and metallurgy is of special interest to us, as dentists, and must ever be remembered in teaching applied physics, as was clearly shown in the essay. Both physics and chemistry are sciences which deal with matter; matter constitutes the universe, the parts of which are so intimately related that it is impossible, in many instances, to establish any sharply defined boundaries between these branches of science. I know it is true that we usually think of physics as dealing with the phenomena of matter involving simply a change in position, form or condition; and chemistry as dealing with the phenomena involving a change in composition, but the distinction in nature scarcely exists. General chemistry has always been taught and fully appreciated in our dental schools, while physics, as such, has been given only little attention, if any. That a course in applied physics should be installed in our four-year curricula is self-evident, and I am going to take the liberty, just here, to wander from the theme of this discussion long enough to say that a course in applied chemistry should also be inaugurated.

The essayist has mentioned the practical subjects which, in his opinion, should be taught in this special course. Now it will be difficult to teach students applied physics unless they have some elementary knowledge of the science; and, in order that we know where to begin this work, it will be necessary to ascertain as nearly as possible the amount of elementary physics studied by the students previous to entering our dental schools. As most of our matriculants are high-school graduates (it is to be hoped all will be in the near future), we must know approximately how much physics are taught in the average high-school.

It was my pleasure, a few years ago, to be connected with the teaching force of the state of Indiana, and in that capacity I was privileged to meet the teachers in conventions from other states. At that time, physics was taught in the high-schools from the standard text-books. I learn, however, that the general trend in teaching the subject to-day is towards more experimental work in the laboratory. This is necessarily limited, on account of lack of equipment. I also learn with a great deal of satisfaction that the high-schools throughout the country are working towards a unification of their courses, not only in physics, but in other branches as well. This is certainly encouraging and gratifying to the professional schools, who are to accept these graduates and complete their education.

The essayist has brought to our minds quite forcibly the fact that there is much in the science of physics which appertains to modern dentistry; but I fear, in teaching this application, we shall be laboring under grave difficulties, until some capable teacher assumes the responsibility of writing and having published a thoroughly up-to-date text-book, and laboratory manual, which will be correlated to chemistry, metallurgy, materia medica, pharmacy and other branches of dentistry, in such a manner that the subjects mentioned may be studied with reference to their interdependence upon each other, both in the lecture-room and in the laboratory. This text-book should contain nothing but that which is true and capable of being verified by the teacher. It should be composed of the practical ideas from all good text-books, together with new ideas on applied physics not yet published. With such a text-book and manual, a uniform course could be given. We are, sadly in need of good, modern text-books. There are too many subjects taught in our dental schools to-day which have to depend for their essence solely and entirely upon the practicability and individuality of the teacher. This institute, it seems to me, could do the profession generally no greater service than by exerting its influence in having some of its specially qualified members write and have published up-to-date text-books upon applied physics, materia medica, chemistry and other branches which could be mentioned.

I shall not attempt to suggest specifically what such a text-book on applied physics should contain, but by giving some thought along this line we find many practical subjects suggesting themselves. The essayist has considered in detail the application of forces, and the principles of mechanics, to all phases of dentistry, and carries it into what I should more properly specify as a course in applied metallurgy. While I consider this to be thoroughly interesting and practical, I feel that he has emphasized this application of forces, in teaching applied physics, at the expense of other important subjects, such as heat, light and electricity. Where or in what calling is *heat* used more than in dentistry? Who should know more about its sources, effects, transmission and application than the modern dentist? Light:—its sources, intensity, reflection and refraction, should be thoroughly taught to our dental students, for light is an important factor in the mouth, in many instances, as well as in the operating room and laboratory, and no dentist is thoroughly up-to-date unless he knows how to handle such instruments of precision as the microscope, photo-microscope, polariscope, X-ray apparatus, etc., all of which depend upon some phase of light for their value. Electricity has been more fully considered in the essay than the subjects of heat and light, yet not as fully as I feel it should be in this special course. This phase of physics has also been treated by itself before this body, and I shall not take up your time by repeating the discussion more than to say that electricity should be thoroughly taught in our course of applied physics.

Perhaps second in importance to a good text-book in teaching these practical subjects, and absolutely necessary in the absence of such, is to have a teacher capable of presenting them in such a manner that they will be interesting to the class.

The general pedagogical principle underlying the method of teaching applied physics differs in no particular essential to that which underlies the method of teaching any subject. A teacher can never interest a class unless he has the ability to hold their attention, and the attention of the class can be had in one of two ways only: By arousing their curiosity, or by showing them that that which we are teaching has a direct application to their future life. Personally, I never had much sympathy for the teacher who has to prey upon the curious nature of the students in order to hold their attention. The valuable teacher—the one who *teaches*—holds the attention and never fails to interest the class, because the practical application of the subjects taught is never neglected. This causes me to reiterate a similar statement, which I made before this body a year ago, in discussing a method of teaching dental metallurgy. In teaching applied physics or physics as applied to dentistry, the teacher must have two special qualifications—a thorough knowledge of elementary and advanced physics, and a knowledge of the practice of dentistry.

DR. BLACK (closing the discussion):

I do not know that I should take up the time of the association in saying anything further upon this subject. Of course, I realize that it would be impossible to have any considerable discussion because the subject is new to the dental teacher. I am sorry for that, but I am well satisfied that in a few years from now this subject will form a prominent part of the dental curriculum and then we will be in a position to speak further as to the value of a course in physics in the dental school.

SYMPOSIUM ON THE MANAGEMENT OF TEACHING BY DEMONSTRATORS IN THE INFIRMARY.

BY DR. S. H. GUILFORD, PHILADELPHIA, PA.

I am not prepared to present this subject fully for the reason that I did not give it the consideration I should. Further, when we are familiar with a subject we rarely prepare ourselves for public expression. What I shall have to say will be largely along the line of what I am familiar with in our own school.

To begin with, we all, from time to time, have to get new demonstrators for the infirmary or other positions in the college. Some men leave because their practice has grown and requires a greater amount of their time, and they cannot afford to do work in college; some for other reasons. Hence we are constantly on the lookout for men to fill these positions. Now, let us suppose that a vacancy occurs and after looking around we find some one who is capable of filling the position. The first thing to do under the circumstances, because in all probability he is a man who graduated some years before, is to bring him into the college and acquaint him with the present day methods in the school. We take him in hand and explain to him exactly the way in which we conduct our infirmary; tell him the duties of the demonstrators; what they are expected to do, and what not. Give him to understand who is the chief man in authority; who comes next, and also what his particular position will be. After that is done, and placing him in the infirmary, it becomes necessary to visit that infirmary from day to day to ascertain whether he is doing the work properly and carrying out your instructions. After he has been appointed it is also necessary to place him in proper relation with his associates in the infirmary and give them to understand that he is there to do certain specified work.

Every infirmary must be properly organized in order to get the right amount of work out of it. We have head men, men next to them, and several assistants. Those men who act as assistants usually have some specific work to do. One, for instance, will pay special attention to the pathological cases; another to the practical work, the crown and bridge work. Others, possibly, to the preparation of cavities, the insertion of fillings, etc. Of course, all the demonstrators are prepared to take hold of any part of this work, but each one is supposed to have individual control over his particular portion of the work.

Now, if we find that this work is going well, and we are supposed to see that it does, another thing is necessary. It is not sufficient to have the head demonstrator and the assistants working in harmony unless you are there with them and understand them. In order to get a full understanding it becomes necessary to have a certain number of meetings during the winter between the professor who superintends that work and the various demonstrators. These meetings may be held once every two weeks, at which time the work in the infirmary is gone over. Ask questions about the clinic; the run of the cases, whether any peculiar or unusual cases have presented themselves, and in general what work is being done by the demonstrators as well as the students. You can give special instructions at this time; or if they are not carrying out your ideas properly you can set them straight.

Those who demonstrate in the infirmary, or have charge of this work, must be in perfect accord with the didactic teachers in the various chairs. In order to do that we have found it necessary, when a new demonstrator is appointed, to have him attend the lectures on that subject and become familiar with the professor's teaching and his methods. We also require that those who have been there for some time go in occasionally and attend the lectures. But the new man must attend all of them in order to brush up on anything new that has occurred since he left college. In that way, the new ones as well as the old ones are in perfect harmony and accord with the chair, and if they have any executive ability at all they ought to be able to carry on infirmary work.

I need not mention the fact that all the infirmary work should be very carefully supervised by the chair having that in charge, in this case the chair of operative dentistry, so as to see that everything is going well.

I realize, and have for many years realized, the difficulty of getting good demonstrators, or taking such material as we can get and moulding it into good demonstrators. It is one of the hardest problems of my life to get suitable men to serve as demonstrators. I remember many years ago Dr. Brophy said to me, "Can you send me a good demonstrator from the east?" I said, "No, I can send you a dozen good professors, but not one good demonstrator." Professors are comparatively numerous, but good demonstrators are very hard to get. So that in my official position I am constantly on the lookout for good material. It does not do to wait until a demonstrator leaves and then take steps to fill his place. I try to have an understudy for every demonstrator in the college. I put him in as an assistant and prepare him for the work so that when the time comes he can step right into the demonstrator's position.

It is very well to have the different chairs filled by competent professors and teachers, but at the same time it is just as important to have men under you who are able to carry out your ideas and instruct the students properly. A teacher is made, and not necessarily born, as we hear it said so often. His efficiency is largely developed through long practice. You can hardly expect anyone to take up a certain line of work and do it well at the start.

He must be trained to do it. The success of every institution depends not only on the teaching but on the actual demonstrations in the infirmary, and we cannot afford to overlook this.

Watch your demonstrators and assistants and see that the work they turn out is satisfactory to you. Do this not only for the good of the school, but in common justice to the student.

Dr. J. Branston Willmott, Toronto, Can.:

Mr. President and Gentlemen:

Considering the comprehensive character of the program prepared for the present meeting of the Institute, any lengthy paper on the subject assigned me would be out of place. A "symposium" on so practical a subject as the "Management of Teaching by Demonstrators in Infirmary," prepared by four persons engaged in teaching the same subject, must necessarily, in its detail, involve considerable repetition. In my brief contribution I will confine myself to the "general" rather than to the "detail."

The teaching of practical dentistry in the infirmary, to be effective must be preceded by a large amount of previous training. Dentistry is a *science* and an *art*. The *art* of dentistry is probably best acquired in a well organized infirmary under the direction of competent demonstrators. The *science* of dentistry is acquired in the lecture room and the laboratory. Just as the surveyor and the engineer first master the science of mathematics and then work the science out in the laying out of a railway line or the building of a bridge, so the dentist should first master the scientific aspect of dentistry before he is ready for a successful training in the art of dentistry.

This science of dentistry should include dental embryology, dental histology, dental pathology, including all the common pathological conditions incident to the dental organs; dental hygiene, dental therapeutics, macroscopic and microscopic anatomy of the teeth, dental chemistry, dental metallurgy. He should be familiar with the scientific treatment of caries, the preparation of cavities, the preparation of filling materials and the insertion and finishing of fillings. In addition he should have had such systematic digital training as shall educate his eye and hand to the easy and proper use of instruments.

Having fairly mastered these preliminaries the student of dentistry may now, but not before, intelligently enter upon the study and practice of the *art* of dentistry on the living subject in the infirmary.

The equipment of the infirmary is not now under consideration, but in passing, we may observe that in the matter of fixed equipment, such as light, chairs, cabinets, wash basins, etc., it should be liberally supplied. Each student should be compelled to furnish himself with everything necessary for all the usual operations. It is very desirable for many reasons, especially for convenience of demonstration, that in any given school this equipment should be practically uniform.

If the professor of operative and prosthetic dentistry could do his own demonstrating we would have an ideal condition. With large classes this is not possible. The duty must be devolved upon a corps of demonstrators. In the appointment of these great care should be exercised, that they are of good character and standing so as to command the respect of the students. They should be thoroughly familiar with the methods of the head of the department and entirely in accord with them.

They should be loyal to the teaching of the staff and to the school in which they are employed. The number required will vary from one to each eight or ten students, to one for each fifteen, or even more, students, engaged in operating for patients, depending on the experience of those over whom he is placed. In a school of, say, sixty seniors, with sixty chairs, and seven demonstrators in the infirmary, one would be given charge of the examination and extracting rooms, one the impression and prosthetic room and the prosthetic work, one the crown and bridge room, one the orthodontia department, the remaining three would supervise the operations for filling teeth. One of these latter would assign the patients, exercising judgment to select an operator whose skill was equal to the requirement of the patient. As their special duties permit, all demonstrators assist the students in any department of the infirmary.

A natural order of "evolution" in operative practical work by the student would be, first the examination of the mouth, noting the operations required, proceed to simple cavities to be filled with plastics, then treatment of pulpless teeth, then more difficult cases of plastic fillings and simple cavities with gold, then restoration of difficult cases with gold, then the use of porcelain fillings, and lastly when skill in the use of instruments has been well developed, the thorough removal of all deposits on the crowns, necks and roots of teeth, and the treatment of pathological conditions of the pericemental membrane.

Where previous private pupilage is not compulsory, most students enter the infirmary entirely ignorant of a great deal that will be immediately required of them. Many of them have never even seen a filling inserted for a patient. To assign a patient to such a student is inexcusable cruelty to the patient. Such students should first be appointed as assistants to experienced senior students. They could expedite operations by preparing the amalgam, mixing the cement, annealing the gold and placing it in the cavity with pliers, etc. A week or two of experience in thus "fagging" for a senior and watching him operate would be of the greatest advantage to them when in the near future they are called upon to undertake a patient on their own account.

When a student without personal experience comes into the infirmary the demonstrator should aid him in his manipulations and in most cases perform the operation, or part of it, for him. He should have him under very close observation lest he go astray and injure his patient. As he acquires confidence and skill he should be taught to depend on himself. Too much assistance on the part of the demonstrator is a great evil. The student who depends upon, and gets, the assistance of the demonstrator to help him out of every little difficulty, will not develop the resourcefulness which is essential to success as an operator, and when left to himself will fail. It is of the greatest importance to the student of dentistry that he get, as early as possible in his course, a clear cut mental conception of what a successful operation should be when completed. This he gets partly from didactic teaching and partly from observing good demonstrations. When he has added to this a knowledge of the requisite manipulations, even though this knowledge may be largely theoretical, all that he requires to become expert is practice. When he has reached this stage of development the demonstrator should only interfere when it is necessary to protect the patient. He will learn infinitely more by meeting and mastering the numerous difficulties which will beset him than by merely watching the expert demonstrator deftly remove them for him.

No student should be permitted to "skimp" any work or operation. Everyone who has had any experience in infirmary work knows how great a tendency there is among a certain class of careless and indifferent students to do this. As a check upon it, no patient, for whom any work has been done, should be permitted to leave the infirmary until this has been inspected by a member of the staff. The knowledge that this inspection cannot be avoided will be a powerful deterrent to careless and slovenly operating. While it will be conceded that the primary object of the Dental Infirmary is the instruction of the student in the "Art of Dentistry" the patient is a very important factor in the instruction, and should be very carefully protected, by the demonstrators, from the malpractice of careless or ignorant students; this is all the more incumbent on the officers of a school from the fact that most of the patients are not there from choice but because they lack the pecuniary ability to go elsewhere for their dental treatment.

Dr. W. P. Dickinson, Minneapolis, Minn.:

The title given for the subject under discussion does not make it perfectly clear what our executive committee had in mind when it was proposed.

The term "management" might be construed to imply difficulty of controlling or directing, or it might imply simply the act of superintending or conducting. My thought is not to quibble over the term, but to indicate a slight embarrassment regarding a point of view.

That demonstrators are a necessary adjunct to most of the chairs, is a fact not necessary to enlarge upon; as to their duties or the character of their work, and their relation to the chairs, under which they serve, something may be said.

From the college announcements it may be readily seen that the corps of demonstrators are not very permanent bodies; that is, that changes are much more frequent than in the list of professors and instructors. It is a question of serious import to the conscientious executive and faculty oftentimes, as to where capable assistants may be found to carry out the teaching of the heads of the departments. In a large degree it may be said that teachers, like poets, are born, not made, and the discerning professor is ever on the keen lookout for developing talent that may later be utilized in his particular branch.

The policy of employing graduates, just out of school, for two or three half days each week, for a pittance and encouragement that connection with the school will be of enough more pecuniary advantage for remuneration, is to my mind a grave mistake. This leads me to say that when a student evinces special aptitude or capability for imparting knowledge to his fellows, this faculty should be encouraged and developed under careful direction of the chair, with the view of ultimately commanding his entire time, with salary commensurate with the value of the services rendered.

The developing of latent talent must be governed by circumstances; it may be permissible in individual cases to employ an undergraduate to assist in demonstrating the technics of a previous session's work, for experience must be obtained and the manner of getting it is as well expressed as can be by the maxim of Commenius, "let those things that have to be done be learned by doing them," or by accommodation, the best way to learn teaching is to teach. All this implies of course that the learning to teach must be under competent guidance and supervision.

It will be taken for granted that the heads of the infirmary departments, as well as others, have been chosen for their known ability and capability of conducting the special work entrusted to their charge. I shall assume that the idea underlying the discussion of the subject in hand is, how to obtain the best results from the pedagogical standpoint. Given the two factors, competent heads of departments, and demonstrators of good capability (I use this word instead of "ability" advisedly) how shall the best ideals be reached? First, to my mind, the details of presenting any particular branch should be in the hands of the chair, and the assistants and demonstrators should be held responsible directly to that chair. In order that there shall be harmony or unity in the teaching, the chiefs of each department should have regular meetings with his subordinates and take up the work in a sequential manner, and go over the entire course, from the simplest element to the most complex operation that will be demanded of the student while in the college.

Possibly it might be inferred that a slavish compliance with the professor's ideas would be required; on the contrary, there should be no stifling or repressing of the individuality of any member of the corps, but the very fact of frequent conferences, particularly during the early part of each session, would benefit all, from the chief to the most inexperienced in the work.

From the foregoing it will be seen that the so-called "Clinical Instructor" is entirely eliminated, the contention being that the student should be thoroughly grounded in a course of study, carefully thought out and systematically arranged by the faculty, as a harmonious whole.

"Too many cooks spoil the broth," and there will be time and opportunity enough after leaving the college halls to observe the methods of others than the faculty and regular instructors.

DR. JULES J. SARRAZIN, New Orleans, La.:

At the outset of any consideration of this subject two opposed contentions may arise. The first is that dental students might benefit by a diversity of methods being didactically discussed and practically illustrated. The second is that absolute uniformity in teachings should exist between didactic and practical work, for fear of confusing the student's mind, instead of supplying a sound scientific basis for him to evolve from. While the first contention may contain beneficial truth when applied to a post-graduate course for practitioners of a few years' experience, there is no doubt in the writer's mind that such a course would confuse the unexperienced student who could be wholesomely fed only with methods based on dental anatomy, histology and physics applied to cavity preparation and filling. Moreover, such a basis will permit no deviation from correct outline, resistance and retentive forms of cavities and fillings, nor from the accurate introduction and knuckling of filling materials; adaptation, edge strength, flow, contraction and expansion, all being included, so that no diversity in the correct application of general principles involved is possible.

The ideal means of assuring close adherence of practical illustration to didactic teaching would no doubt be a personal, constant, day after day supervision of the demonstrators' work by the professor. This is, I believe, not often possible. It is not so in the Crescent City, unfortunately. We have arrived at other means of obtaining harmony between word and deed, which, although not the writer's ideal, seem an acceptable substitute. Our professor of operative dentistry is also professor of dental anatomy and operative technics. This at once permits application of dental anatomy knowledge to operative procedures in the treatment and filling of root canals, in cavity shaping which will weaken neither the functional faces of teeth crowns nor lobes of formation not continuous with teeth roots (or will otherwise dictate their complete removal), and in the shaping of proximal faces and their knuckling at marginal ridges. It allows emphasizing the necessity of occlusal stress being placed on filling material itself where natural binding marginal ridges are gone. This combination of didactic branches also suggests the handling of operative dentistry as identical with operative technics, plus oral secretions and the means for their exclusion, plus the living tissues and micro-organisms, plus the pigmentation of dentine, and the nervous system of the patient.

An unusual condition is that our Dean is at the same time demonstrator of operative technics (with a capable assistant under him) and professor of clinical dentistry, with clinic demonstrators also under him. This arrangement has grown out of the fact that he and our professor of operative technics, operative dentistry and dental anatomy have found that their ideas in operative dentistry ran in similar grooves, and have accordingly reached a conclusion, at least convenient, that their grooves must be correct since scientific basing will not permit divergence in such matters. They have agreed on some details, such for instance that root canals had better be enlarged by drilling than be septically pumped by cleansers, and had better be filled with gutta percha made germicidal than with semi-solid paraffine, that any incisal angle or marginal ridge, which, after the preparation of a simple proximal cavity, might be approached closer than 3-32 of an inch by a morsal wall, should be removed, except in cases of non-functional bicuspids or molars, and provided that the patient would solemnly promise never to allow an antagonist to be inserted, as there must be exceptions to all rules. Under this same exception, *but in no other case,* is it permissible to form a proximo-occlusal cavity for metal with a V-shaped morsal opening, and with retentive grooves in the buccal and lingual walls reaching vertically in the morsal direction, this provided moreover that the natural adjacent occlusal grooves in the crown perfect. The two department heads have otherwise easily agreed that in all usual cases correct retentive proximo-occlusal filling form, to oppose any strain, requires step formation with the extremity of the morsal dovetail floor dipping pulpally, and with anchorages placed at bucco and linguo-gingivo-axial cavity angles only, and that matrices are absolutely indispensable to all properly made compound amalgam fillings, and nearly so to gold disto-occlusal ones. They have also agreed that step retention was indicated in incisors where an incisal angle was absent, in preference to a lingual horizontal auxiliary dovetail, which latter in its turn became preferable when an incisal angle could safely be preserved to avoid filling material display. They have agreed on occlusal anchorages for compound amalgam fillings being wider-necked and slightly deeper than those for gold, on cavo-surface angles of histologically inclining enamel walls being beveled for gold and not for amalgam, and on the proportion of cohesive bulk to non-cohesive gold placed at the cervical part of a compound cavity being *at least* two to one. In fact they have as much as possible made sure that the heads of the practical and didactic departments would both preach the same sermon.

This first step having been made it has been our custom to call joint meetings of operative technique and clinic demonstrators, and with both above mentioned heads present, to rehearse matters, laying down the lines of teaching so as to make them harmonious. Then follows putting theory into practice by one professor lecturing and clinicing and the other overseeing the work of technique and clinic demonstrators. This has been our method, based on the conclusion that didactic and practical teaching must be and cannot be otherwise than the same, if correct. There is, however, one subject on which my mind is ill at ease, because, in the absence of a solution of the question by general experience, I see a necessity for teaching two different methods. This is the retention of porcelain inlay incisal angle or mesio-morsal first bicuspid restorations. Scientific basis and experience have established beyond doubt that metal fillings of that class could be safely retained only by step formation. An iridio platinum pin, No. 23 or 24 B. & S. gauge hooked at a dovetail's extremity, and with a rounded head baked in the porcelain inlay, first cemented in the cavity and afterwards veneered over with cohesive gold, is ample to afford the necessary step retention, I believe, without weakening the porcelain on account of its small diameter and rounded head, provided it be judiciously placed. Lingual horizontal auxiliary dovetails will here be indicated instead of incisal steps and deep enough central groove occlusal anchorages in bicuspids. The preceding refers of course to crowns with live pulps, the others not presenting the same difficulties.

On the other hand, some porcelain inlay experts assert that a good cervical seat for the inlay, combined with the adhesiveness of cement (which should not be much over 1-1000 of an inch thick in the finished work except at and nearing the cavity floor), will satisfactorily withstand the average 200 pounds pressure of normal occlusion. Joiners expel all the glue possible between wood joints, but do not resort to that construction to resist force from a plane parallel with small glued surfaces. A mast is not made of truncated cones separately glued together under pressure, and a lead pencil opposes about two square inches of glued surface to a working point which hardly strains. Yet, it is confidently claimed that a short cement joint, lying in a plane parallel to that of the enormous force applied, will save the inlay, provided it be well seated cervically. For my selfish good and that of suffering humanity may this be true! For the present, however, a departure from the rule of monotheism in teaching might be made on this subject and our advanced students be given acquaintance with two opposed methods.

I close in the hope of having said only one useful word on a subject so vital.

GENERAL DISCUSSION.

Dr. A. O. Hunt, Omaha, Neb.:

The question of the relation of the professor and his teaching to teaching methods in the infirmary is one of the vital questions of the dental school. There are so many difficulties that enter into this relation that are almost insurmountable that to make a satisfactory adjustment is a matter of the greatest difficulty. The things that the professors teach and the things that the demonstrators have to do are not always in the best relation to each other. This is not the fault of either one or the other, but the result of a number of conditions. Every teacher in didactics has trouble to impart the desired information to the student, and at the same time fix an idea in his mind of the very highest order. He may even go to extremes in teaching to accomplish this purpose. This is undoubtedly more nearly true in the department of operative dentistry, as the ideals and the conditions met with in the infirmary are not always ideal. The professor does not go over all the minute details that are essential to operative dentistry, hence the schools have adopted methods of technique that give the student a good working basis, the details to be filled in by the demonstrator during the performance of the practical work. In the lecture room, as well as in the technic room, conditions may be made, but in the infirmary these conditions are very much interfered with, or are not the same. The indifference of some students, the indifference of the patient, the lack of intellectuality in the patient, interferes with carrying out perfect instrumentation. One difficulty with some students is, they must be shown everything. They are not all disposed, if they have an operation in hand, to start from the beginning of the case and make a careful diagnosis to work out in their minds all the conditions that are present, and thus arrive at the best methods that they should pursue in getting ideal results, as they have been taught to do in the lecture room, the technique room, etc.

Now, no matter how efficient the demonstrator may be, he cannot entirely overcome conditions like these. He cannot always make the student think; he can make him do certain things by not giving him credits. To help to overcome this difficulty, I adopted a plan many years ago of crediting the work step by step as it progresses, hoping thereby to inculcate the habit of thinking and diagnosing, reaching results mentally first, and then practically. That is, mark him upon the diagnosis of a case as one step; the preparation of the cavity as another. The manipulation and preparation of the material to be used, each represents a mark for him. He cannot go beyond any one stage without having it examined, because his card is punched at each division so that any demonstrator knows what the last mark was given for. The result is it prevents the doing of serious harm and going beyond the point where teaching is essential and absolutely necessary.

There is another difficulty that presents itself, and that is the demonstrator himself. Many demonstrators have the ability to tell how things should be done better than they can show the student how to do it. Others have the ability to show the student how it is done better than they can tell how to do it. Demonstrators of either character are valuable, but these are conditions. We do not find in demonstrators any more than in persons in other walks of life and professions, that they possess all the good attributes and good qualities that are ideal in the teaching of dentistry. One man's ability runs in one direction a little stronger than in another. Schools that are fortunate to possess demonstrators who possess all these qualities and attributes are to be congratulated. Unfortunately that kind of a demonstrator is the one you cannot keep very long. Their individuality and ability naturally carry them out into the world doing for themselves; whereas everyone knows that college work offers but little compensation.

By a system of examining each step of the operation, the student is put on his mettle all the time, the best interests of the infirmary are being looked after and the patient is certain of getting the very best work. The credits are punched out of the ticket and are figured up so that the proper credit may be given for that particular operation. This method has proven itself as feasible and it comes very near being perfect.

Dr. J. Q. Byram, Indianapolis, Ind.:

We have had five subjects from five deans. I will speak from the other side of the question. I do not believe all that Dr. Hunt has said, that you cannot make the student think in the infirmary, or rather that the student does not think there. If he does not think there, something is wrong; he should be taught to think while he is working on the case. I will admit that there is a tendency for him not to think, but if our demonstrators are trained so that they simply go and help the student when he does not actually need help, it is true that in a short time the student will not think. I believe that we can train students to think in the infirmary and in every department. If the student comes to me for assistance in the technic department, I tell him to reason out how the operation should be done, and if he cannot get it, then to come to me for assistance. I do the same thing in the infirmary. As an example, a student comes to me with a case of pulp treatment. He may be trying to remove the pulp, and even though I try to give our students a thorough course in dental anatomy, many of them forget that a lower molar has two roots and that the mesial root usually has two canals. He cannot find all the canals. I do not try to find the canals for him, but I refer him to his dental anatomy and tell him to do all he can without my help. If, after working a while he cannot find the canals, then I assist him. When I demonstrate in the infirmary I do not help the student by doing the work, but I try to help him to help himself.

As to the difficulty of securing good demonstrators: Every one will admit that it is exceedingly difficult to get good demonstrators (that is the reason I was "fired" from our infirmary). I think that one difficulty is that when we get a good man it is only a short time until he leaves us. The trouble is that the demonstrator gets a very small salary. He probably gives half of his time to the college and the remainder to his private practice. He is a young man beginning the practice of dentistry in the city, and if he is the right kind of a man, he begins to build up a practice after he has been with the college but a short time. He realizes more from his practice than from his college work, and as a result he stays with his practice. In most cases the college prefers to look for another man rather than pay him enough to justify him remaining with the school.

The trouble is that you do not pay these men the salaries which justify them staying with you. You cannot keep a good man unless you pay him enough. The cheap man is always unsatisfactory, and you do not want him. Pay your demonstrators well and you will always have good ones.

Dr. C. N. Johnson, Chicago:

I have just a few words to say on this very interesting subject. The management of the demonstrators in the infirmary is becoming to me more simple every year. There has never been any difficulty in having perfect harmony in my department. I have never experienced the slightest tendency to lack of loyalty on the part of any demonstrator in the institution with which I am connected. I want to pay that tribute to the demonstrators who have taught under me, and many have. One reason, probably more than any other, that is responsible for this harmony, is that for the most part the demonstrators in our college are graduates of our institution, and I leave the demonstrating to them.

I have, as the superintendent of the department, on the floor a man who is superior in ability, and he is absolutely loyal. He is there all the time and all matters in the infirmary are referred to him. He reports to me every week, and if there is the slightest discrepancy it is referred to me at once and it is rectified; not by me but by him on my advice. The reason I keep away from the infirmary is this: It used to be the case that when I went through the infirmary to see what the students were doing, that students would call me here and there to give my judgment on this or that case. Nine times out of ten the student was calling me to see whether he had received the proper instructions from the demonstrator. He had already appealed for assistance to the demonstrator and had received his instructions, but he also wanted my idea, and because of the fact that I was sometimes able to decide the question more rapidly or in a different way, it was demoralizing at once. It gave rise to the suspicion that the demonstrator was not entirely qualified. And I ask my students to show the same loyalty to my demonstrators that they show to me.

I want to cite just one instance that was instrumental in making me change my plan, and it is why I will not, unless requested by the demonstrator, go to a patient and demonstrate. One day, in the infirmary, a demonstrator had a case of a lower second molar. The first permanent molar was out; the rubber dam was on; the second molar was tipped slightly forward so that the student had considerable difficulty finding the root canals. He said that he had found the canal in the distal root, but could not find the one in the mesial root. He called the demonstrator, who tried but could not find the canal either. The demonstrator was called suddenly away from the chair and in his absence the student slipped around and called me without informing me that the demonstrator had seen it. I went, looked the case over, picked up a bur and exposed the distal canal. Both the demonstrator and the student had, on account of the tipping of the tooth, mistaken the mesial for the distal canal. It was the laugh of the whole college. It went around the infirmary like wild-fire and it interfered with the demonstrator's efficiency as a teacher in our college.

Demonstrating should be left in the hands of the demonstrator, and there should be absolute loyalty on the part of the demonstrator to the professor.

I want to express my opinion, as Dr. Byram has said, that Dr. Hunt is mistaken in regard to the fact that the demonstrator cannot make the student think in the infirmary. I use the expression that Dr. Hunt used, but I do not believe that he means that. The very thing above all others that the demonstrator is there for is to make the student think. The worst kind of demonstrating I know of is where the student calls the demonstrator to the chair and asks him what he is to do next, and the demonstrator picks up an instrument and does the work himself. That is not efficient demonstrating. I instruct my demonstrators something like this: You must not allow any student to do damage to the patient, but when the student comes and asks you what he is to do in that particular case, stop him and ask him, "What is your opinion as to what you had better do?" Make the student think the thing out himself and never give an opinion until the student has expressed himself on that particular point. This is not the way that these things were done years ago when we sent students out of our schools mere machines, without any judgment whatever. Their reasoning ability had never been developed. But now the student himself decides the matter, and then if there is a mistake in his reasoning he is corrected by the demonstrator before any harm has been done to the patient.

All along the line of teaching it is not merely a matter of pounding knowledge into the student, but of developing his reasoning faculties. There is no teaching more vicious than that which makes a mere machine of the student. He should be taught to think for himself; let him solve his own problem and you are doing him vastly more good than by continually showing him how to do it.

Dr. Geo. W. Dittmar, Chicago:

I have had a little experience as a demonstrator, and one question comes to my mind in this connection, and that is this: Would Dr. Johnson teach or instruct that student before the patient as regards to the proposition in hand? Would he have the student make the diagnosis there and probably outline his method of treatment, and then, perhaps, have it entirely wrong? If the demonstrator's opinion is at variance with that of the student, and if he gives expression to that opinion, may not the patient lose his confidence in the student?

Dr. Johnson:

It is impossible to escape consultation in this matter in the presence of the patient. Any demonstrator who has any tact at all, even if the student is entirely wrong, both in his diagnosis and the method of treatment, can correct that error by using only technical terms so that the patient will not be cognizant as to what is being said.

Dr. A. O. Hunt, Omaha, Neb.:

I certainly do not want a wrong impression to prevail as to what I said or meant. I was speaking of the conditions that exist in the infirmary, and one of the conditions I named was the tendency of some students not to think. Often they want to have something demonstrated, saying that they can understand it better if they see it done. On occasions that, perhaps, is the best thing and it may lead to better results, but some students do not like to study a thing out, work it out for themselves. That is what I want to be understood as having meant, and not that it is a general thing among students, but that it is too common.

As to whether you are going to debate a case in the presence of the patient: While I would not in any way, or for any reason, injure the feelings of a student in the presence of a patient, yet I believe that the best results will follow if you keep in the mind of the patient all the time, and in the mind of the student as well, that he is a student under instruction, and that he is not expected to know everything. The best results are obtained by keeping in the mind of all concerned the relation of things. You are instructing the patient at the same time as to the nature of the trouble and what had best be done to remedy it. I have always adhered to the belief that a successful practice is better maintained by having your patient know as much as possible about dentistry and in the infirmary you are instructing many people. I can see no harm in debating a question in the presence of the patient so long as it is done in the proper way without humiliating the student. Do it in a thoroughly scientific manner and only with reference to the particular case in hand.

Dr. G. V. Black, Chicago:

I have listened to this discussion with a great deal of pleasure. Such a discussion as this could not have been held five years ago.

We as teachers did not have a sufficient amount of training in this work to have held such a discussion; one that is as broad in its bearing as the discussion we have had to-day. To me it means great progress in our work. Now a word or two as to some points in connection with the training of the student in the infirmary.

I like to have my demonstrators meet me every week and talk to them about what I am lecturing on to my class at that particular time, and have those particular things reinforced by the demonstrators in the clinic room following the presentation of the subject in the lecture room; not that they are not giving attention to those things all the time, day after day. But just at the time that the lecture is given and following that is one of the best times for the demonstrators to reinforce these things as they come up in the clinic room.

If I have given a lecture and demonstrations in the placing of the rubber dam, I would like every demonstrator to give that his special attention for the next week or so. And so on with everything I do in presenting subjects to the class. I think that this serves to reinforce the work of the lecture room very powerfully.

I appreciate very keenly the difficulty of obtaining a good corps of demonstrators, efficient men. The conditions under which we work make that unusually difficult; that is, unusual as compared with other things. But for the present we must get along with that difficulty the very best way we can.

The question of consultations before patients is, I think, rightly put by Dr. Hunt. We should not refuse to consult with students or student demonstrators before the patient. In fact, the more plainly we keep it before the public or the patients who come to us that this is a school; that the students are studying dentistry, that they are studying these operations, and that consultations are the thing, the better it is for all concerned. It is better for the student, better for the demonstrator, better for the patient that these things be done.

As for the patient: The patient should know that he is under guard all the time. The work must be examined; the student must have a written permit to operate on that patient; a written assignment, and that is his authority for undertaking any operation. You all know that the State Board of Dental Examiners does not allow persons to practice dentistry who have not passed the regular examination for license to practice. The student who goes to work on a patient without having this permit or assignment might be subject to arrest. From the time the patient enters the infirmary until he leaves both he and the student are under guard and under the care of the demonstrator or the professor, and the student does nothing without their sanction. That is a legal form and it is a form for the protection of the patient and for the instruction of the student, and every step of the work must be examined before it is passed and a record made of the whole. Next year, when it is asserted that such and such a thing was done in our school by such and such a student, even if the student is not known, we ought to be able to take it up and go through all those steps and know under whose eye this thing was done, how it was done, by whom, etc. Everything should be a matter of record so that we may know all about it.

So that this careful guarding of the patient's interests is also a careful guarding of the interests of the student, and if they do any one step of the operation that is not just right, they should be set right before they are allowed to go to the next.

Dr. H. A. Smith, Cincinnati, Ohio:

There is one thing that occurred to me while listening to this discussion as to the demonstrator. It is the announcing of a number of demonstrators by certain colleges who never appear as teachers. In fact, it has been known that demonstrators are advertised who have been dead for years. Is not this done with the view of taking an unfair advantage of colleges that are more honest in their methods and only announce the names of men who appear and serve as they are expected to by the student?

With reference to the professor being on the floor of the clinic room: I think it is possible for the professor to be on the floor too much. The students seem to lose their respect for a man who is always prowling around. When he does appear on the floor let there be a reason for it. I suggested that some years ago to the late Dr. Menges, who, as you know, had his office right on the infirmary floor, and he said, "By George, I never thought of that."

In regard to consultation with reference to a certain case in hand: You all know that the student is very sly and will come to you whether he really wants an opinion or not, hoping to get a different opinion from that which the demonstrator has given for the purpose of making mischief, and if you are not very careful you are liable to be caught in the trap. How can you avoid that? By approaching the case modestly, as any consultant ought; the conference should be conducted somewhat on the lines of a true medical consultation. Respect the doctor who has been there before you; find out, if possible, what his opinion is. Do not take a decided position until you have had a full and free conference with the demonstrator in charge of the case.

DR. N. S. HOFF, Ann Arbor, Mich.:

This matter of abuse of a patient to which Dr. Smith referred reminds me that oftentimes patients are abused in our clinics by being disappointed in regard to their work. Students will not keep their appointment with their patients. Opportunity also occurs for abuse in connection with the crown and bridge or prosthetic work, by unnecessary delays in completing the work, or by unintentional and sometimes by intentional slights in construction. I would like to have some of our wise clinical managers tell us how they manage to keep the student in line and make them keep their appointments and not abuse the confidence of the patient.

DR. J. Q. BYRAM, Indianapolis:

We have a scheme at our school that remedies the matter to which Dr. Hoff refers. We work by the point system. We have an engagement book and engagement blanks. The student makes an engagement and gives the patient a duplicate. The clerk records all engagements in the book, and if the student forgets the engagement he can refer to the book. If he failed to make a written engagement with the patient, he is held responsible; and if the patient comes and he is absent we charge him with a broken engagement. If he has a written engagement and fails to keep it he is also charged with a broken engagement. We deduct fifteen points for each broken engagement. At the end of the year these points are deducted from his total credits.

DR. H. L. BANZHAF, Milwaukee, Wis.:

I would like to have Dr. Berry tell you what we do in our school in Milwaukee in answer to Dr. Hoff's question.

Dr. F. H. Berry, Milwaukee, Wis.:

I do not know that I can shed much light on that subject except that in my case a good deal depends, perhaps, on my own individuality by keeping a tab on the thing myself. I know what appointments the students make; I know when work ought to be ready for the patient; I try to keep in touch with the patient and know when they are coming and by keeping the different things in mind in this way we manage to get along very well.

Then I keep a sort of point record which counts either for or against the student and at the end of the year I check them up either to their credit or discredit, as the case may be. I think by letting the students know that you are keeping this record, no matter whether it is correct or not, it serves both as a check and a spur. It has an influence in keeping them busy and interested in their work. Of course, a good deal depends on the control the man at the head of the infirmary has over his students. Whatever you may devise to make them do just what they are expected to do, will be a success only in proportion to the way it is enforced.

Dr. H. L. Banzhaf, Milwaukee, Wis.:

Dr. Berry is too bashful to tell you just what he does to control his students. Dr. Hoff wanted to know what the wise ones do to control the students, especially in regard to keeping their appointments. Dr. Berry has a little box nailed at the end of the infirmary and in this are placed the names of all the students who work in the infirmary. The box contains a number of brass bars on which the doctor has printed the name of the student. As a case comes in the bar at the bottom is taken out and the student whose name is on this has the case assigned to him. Then this bar is put into a drawer. Each day, in the morning, the demonstrator looks into this drawer to see just where the student is and what he is doing. If he is not in the laboratory he immediately finds out what he is doing, and why he is not in the infirmary. In that way we keep close tab on our students.

Dr. Berry:

I did not mention this part of it because I do not call that teaching methods. It has its good effect so far as the school is concerned in getting the work out on time, but it teaches the student to be punctual in a machine way. It is not just the best method.

Dr. W. E. Grant, Louisville, Ky.:

Teaching methods in the infirmary. This subject is so broad and so important that we ought to devote a whole day to its discussion instead of only a few hours. As to the matter of teaching the student to keep his engagements. It is important to have a time limit during which the student is allowed to meet his patient, and that limit ought not to exceed fifteen minutes. That is to say, if a student has an engagement at two, and he is not there at fifteen minutes after two, the engagement is considered as being broken and the case is turned over to another student. The erring student should also be punished by giving him more work or by taking off so many points from his credits. (If you use the point system, which I heartily recommend, not only in the operative department, but in all departments, the student is graded on the point basis.) Of course, it has its disadvantages as well as its advantages.

It is not fair to the patient to turn him over to a student who is not competent to do the work. The student should, if possible, begin on simple gold fillings and simple work of all kinds. He must work gold to learn to work gold, etc., for that is the only way in which that student will ever learn, and, furthermore, the work is being done under the supervision of a corps of demonstrators so that no harm will be done the patient.

Dr. Guilford:

That is the plan exactly that we pursue in our school. The student is allowed fifteen minutes. If he does not appear then the case is assigned to another student.

Dr. Patterson:

I would like to know how the student, who is unable to perform a certain difficult operation, is going to be taught to do this work if all such cases are referred to those students whose ability is unquestioned. It appears to me that this method is very unfair and partial.

Dr. J. Q. Byram, Indianapolis:

I have adopted a scheme this year which I believe will answer

Dr. Patterson's question. It is a co-operation of the technic and the infirmary. As I stated a moment ago, we use the point system. I give the student points on all technic work; these points have a certain value in the infirmary. As an example: we give seven points for each practical shell crown and four points for each shell crown made in the technic laboratory. Our requirements in Junior crown and bridge work before the holidays were two molars and a bicuspid. Some Juniors have made as many as twenty technic crowns. If they are not busy in the infirmary this system encourages them to keep busy. They go to the technic laboratory in the afternoon, and if a student is wanted in the infirmary the demonstrator sends for him. The busy students are learning something.

I am also using this system in the plate work and when we have a four years' course I propose to inaugurate it in the operative tehnic department. My idea is to keep the boys busy from the time they enter school until they leave. We know that students feel that they do too much technic work; they do not see the result. By encouraging the student to do this work, and by giving him these credits, he will work, and he works in a different way, because he is anxious to have a large number of points. The poor student must work or he gets behind.

Dr. Patterson:

I allow that the technic work is exacted from them all, but it is a common practice that a certain operation is given to a certain student because he is most competent to do it. That is common practice, but it is a wrong practice. The man who can perform the operation does not need the practice as does the man who is not able to perform that particular work. I do not understand why the best operators should do all the work that is difficult of performance. They do not need it, while the others do. It is a pernicious practice, one which should not be encouraged.

Dr. Byram:

Out of a class of sixty students there are about twenty who stand above the others. There are at least ten who are far below the other fifty. About half of the class can be placed on a level. Let us take the ten students who are not proficient, and if we give one of them a difficult operation, what is the result? In most cases the result is far from being satisfactory to the patient, student or the demonstrator. Even though we require the student to do the work over, in most cases the patient becomes dissatisfied and goes elsewhere. Patients who come to our infirmaries have other things to do besides having dental operations performed.

By requiring the poor student to work on his technic, and to do more technic than the better ones, and by giving him his points, it encourages him, and brings him up to a certain mechanical standard which will enable him to do the operation successfully.

Another point: theoretically all students should be on a level in the infirmary, but practically this is bad.

We have many patients come to the infirmary because they feel that their work will be well done. If we give these patients to inferior students we drive them away and decrease the clinic. We must build up the clinic by giving a difficult operation to the best student. He is better than the other because he is naturally more proficient. The poor student must be brought up step by step; the simpler operations first, then, finally, give him difficult work. In my opinion it is not justice to student or demonstrator to give difficult operations to the poor student until he becomes proficient.

Dr. W. E. Grant, Louisville, Ky.:

I hope that Dr. Patterson has been answered. I want to bring out this point—that dividing the class as Dr. Byram has divided it, you do ten poor students an injustice. If you pile on work that they cannot do you discourage them, and, as Dr. Byram says, you must take care of your clinic. These patients expect to get good work and they ought to get it. You cannot do as you please with them. You must build up the infirmary practice as you would build up your own practice. You must take care of it; you must nurse it, and here efficient demonstrators will help the good work along. The point is this: If a six or eight-tooth bridge comes in, and that poor student is not competent to make a shell crown, how much harm you are doing him by assigning that case to him. Put him back on his technique.

Dr. Patterson:

What is the purpose of the dental infirmary and dental teaching? Is it to build up an infirmary practice or to make dentists?

Dr. Grant:

Unless you have an infirmary you cannot make dentists, and for that reason you must nurse this practice if you are going to make dentists out of the best part of your class. You must not injure ninety per cent of your class in order to develop those ten poor students. Let that man go back and give him an infirmary case in which he can put on a shell crown, and put on a two-tooth bridge instead of a six or eight, which he is not competent to handle.

Dr. G. V. Black, Chicago:

The infirmary patient generally is the patient of that particular student; at least, that is the case in our infirmary. They come for the purpose of having a particular student perform some operation upon them, just as our patients come to us in our private practice. Now, I do not want to give that patient over to some other student. I will punish that student for failing to keep his appointment in some other way. I want every student in my infirmary to be building up a practice of his own, gathering his patients around him. That is his business just as it is his business to perform the operations properly. And if it so happens that the case which is assigned to a student is too much for him, somebody must assist him. What is the demonstrator there for? Somebody must assist the student and see that the patient is properly dealt with. It is impossible for us to parcel out the assignments in exact accordance with the ability of the student. We cannot do that; we must watch over and assist those cases that fall into the hands of students who are incapable. In that way we will also guard our infirmary practice, at the same time teaching the student who is incapable.

INTERNATIONAL DENTAL FEDERATION, MADRID, SPAIN.

Proposition of Dr. Frank, of Vienna, on the Subject of the St. Louis Dispute.

In regard to the conflict between our American fellow-members, I beg to submit to the Executive Council the following proposition:

The Executive Council of the International Dental Federation enlarge the committee of nine by making it a committee of fifteen members; that it request Dr. Smith to withdraw his resignation; that the Executive Council will, in case of his refusal, replace him.

The Executive Council invites the two committees of fifteen to work together in the preparation of the Fourth International Dental Congress, and requests them to name two vice-presidents, etc., who, having the same rank, will have to direct alternatively the transactions of this double committee.

The President of the International Dental Federation will have the functions of President, and the two Secretaries will have to report to him regularly important dispositions. The President of the International Dental Federation will take charge of the presidency in 1904 as soon as he arrives in America.

In case the Executive Council should not accede to this last proposition, I submit a second one:

Name as President an American fellow-member as a third member of the double committee, not belonging to this committee.

I hope and I wish with all my heart that the F. D. I. will succeed in bringing about good results in all its deliberations.

In case the Executive Council should concede to a substitution, I beg to choose Dr. Weiser as my substitute. In any other case, I transfer my vote to our general secretary, Dr. Sauvez.

REPORT OF THE SECRETARY-GENERAL.

MR. PRESIDENT AND HONORABLE FELLOW-MEMBERS:

For the third time since the foundation of the International Dental Federation, it is my mission to deliver an address in the name of the Executive Council in order to lay before the members who assist at the opening of the general assembly of the Federation a review of the salient facts that have passed during the present year, and the programme of the session that is about to be opened to-day.

I pray my colleagues of the Executive Council to accept my thanks for their continued confidence in me, and for the great honor they have conferred upon me.

I will recall briefly that the creation of the International Dental Federation results from several resolutions having been accepted by the General Assembly of August 14, 1900, of the Third International Dental Congress, of Paris (resolution No. 11). It was constituted by the National Committees which were formed on this occasion and whose mission is to prepare the next International Dental Congress.

In short, it is represented by an Executive Council composed of nine members chosen by congressional representatives from all countries present at the General Assembly of which we have just spoken, and the powers of this council will expire at the opening of the Fourth International Dental Congress which it is charged to organize. (Resolution No. 15.)

Conformably with resolution No. 16, the council has named an International Commission of Instruction whose duty is to establish a scale of theoretical and practical knowledge which a dentist should possess, and the number of this commission has increased from session to session, coincident with the importance of its work.

The council has, moreover, created an International Commission of Hygiene and of Public Dental Service, which constituted its bureau last year, and the workings of which have been very assiduously observed.

Since its creation, in 1900, in Paris, the International Dental Federation has had two sessions, of which the first, in 1901, at London and at Cambridge, under the presidency of Sir Michael Foster, the great physiologist, will be found in the first volume of the reports given of the I. D. Federation, the account of work of the sessions of Paris, London and Cambridge. These accounts given were published last year in French and in English wholly, and in Spanish and in German partially.

The second session was held at Stockholm, under the presidency of Professor Lindstrom, the well-known anatomist.

The account given of the work at Stockholm appeared in French only a few weeks ago, on account of the short interval between the two sessions; the greater number of the members who are here should have received it. This volume contains the authentic minutes of the several meetings which were held at Stockholm, the Executive Council, the Commission of Instruction and the Commission of Hygiene and Public Dental Services. The latter have been drawn up by Messrs. Martinier and Heidé, Secretaries of these two commissions. It has 400 pages, including a series of documents on the subject of legislation and the teaching of dentistry in general. It will be possible by this publication to verify the importance of all the questions examined and discussed by the authorized representatives of the several countries.

The report given at Stockholm has not yet appeared in the English language. Dr. Kirk, who accepted this mission, has had a large part of it appear in the *Cosmos*, and he recently announced to us that the proof-sheets of another part were ready for publication in July.

Now let us see what events have occurred since this last session: Dr. Aguilar, member of the Executive Council, going to the United States of America immediately after the reunion at Stockholm, had been commissioned to take the acceptance of the invitation which had been sent to the Executive Council of the Federation to hold the next International Dental Congress at St. Louis and to announce the nomination of the committee of nine members to represent the Executive Council in the organization of the next congress. We thank him for having accomplished this mission with the care and punctuality that we all know him to be capable of.

The short space of time that separates us from the last session has much injured the preparation of this present session at Madrid, for it has been impossible to show, like last year, the series of reports for discussion by the members of the commissions.

But, the great international reunion which is going to be opened to-morrow in this beautiful city offers a unique opportunity to bring together the several personalities who have been delegated by their societies to the annual sessions of the Federation during the year 1903. That is why the Executive Council has accepted the invitation that was sent to it last year by his Excellency the Spanish Minister, to Stockholm to hold the third session of the F. D. I. at Madrid at the same time as that of the Fourteenth International Medical Congress.

Professor Hesse of Leipsic, a member of the Executive Council, detained at the institution which he directs in that city through a course of lectures and examinations at the university, cannot be with us, and has been replaced in the Commission of Instruction by Professor Miller.

Dr. Klingelhofer, who has been named a delegate from Russia, by the Congress of Odessa, last year, in close touch with the Executive Council, in replacing Professor Limberg, who is ill, has been good enough to bring to the F. D. I. the support, adhesion and the authority of this immense country.

We have been requested to excuse Messrs. Paterson of London, Frick of Zurich, Guillermin of Geneva, Guildberg of Christiania, Kirk of Philadelphia, Quendot and Viau of Paris, members of the Commission of Instruction. Some among them are also members of the Commission of Hygiene and Dental Public Service.

Here is the list of the governments or societies who have actually apprised us of the envoys delegated:

GOVERNMENTS.

Italy, Mr. Guerin; Sweden, Mr. Forberg.

SOCIETIES.

Germany—Central Society of German Dentists, Messrs. Miller, President; Diect, Vice-President. Central Society of American Graduated Doctors of Dentistry, Messrs. Hubertus E. Voss, Jenkins, Milke.

United States of America—National Dental Association, Messrs. Matthew Cryer, G. V. I. Brown. Chicago Dental Society, Odontological Society, Odontographic Society, Illinois State Dental Society, Chicago College of Dental Surgery, Messrs. Brophy and Harlan. The New York Institute of Stomatology, Messrs. Isaac Davenport, George A. Roussel, Jenkins of Dresden.

England—British Dental Association, Messrs. Cunningham, Harding, Harrison, Mansell, and Gilmour and Whittaker, the two latter being specially designated by the Midland Counties branch of the British Dental Association.

Austria-Hungary—Central Society of Osterr-Stomatologen, Messrs. Herz Frankl, Wunscheim, R. Weiser, Zsigmondy.

Belgium—General Association of Belgian Dentists, M. Brunzlau.

Brazil—Odontologique Institute, M. Montil.

Spain—Medical Faculty of Madrid, M. Aguilar. Odontologic Society of Spain, Mr. Luis Subirana. Odontologic Society of the Balearic (Isles). Odontologic Society of Catalonia, M. R. Pons.

France—National Dental Federation, Dental School of Paris, General Association of Dentists of France, Odontological Society, The Odontological Journal, Messrs. Coignard, Delair, Godon, Heide, Martinier, Papot, Roy, Ronnet, Sauvez, Viau. Syndicate of Surgeon Dentists of France, Messrs. Ronnet, Védrenne, Nux. Dental School of Lyons, M. Pont. Syndicate of Surgeon Dentists of Bordeaux, M. Marronneau.

Norway and Sweden—Dental Association of Norway and of Dental Teaching, Mr. Smith Housken. Government and Society of Swedish Dentists and National Swedish Committee, Mr. Forberg.

Portugal—Society of Dentists of Portugal, M. Gonzales.

Switzerland—Odontological Society of Switzerland, Messrs. Guye of Geneva, Bryan of Basel. Dental Society of Basil, Messrs. de Trey, Respinger.

Finally for the American Dental Society of Europe, Messrs. Jenkins of Dresden, William Mitchell of London.

Let us see now what the program is of the work to be done during the present session.

One of the most important matters will be the examination by the Executive Council of a dispute that has arisen in the United States in regard to the congress that is to be held in 1904, on the occasion of the Universal Exposition of St. Louis, Mo. We must, in a few words, acquaint you with this incident. Last year at Stockholm about ten professional societies or officially authorized persons sent to the Executive Council of the Federation a regularly presented invitation asking it to decide that the Fourth International Dental Congress be held at St. Louis. This polite invitation was accepted by the majority of the members of the council, who alike named a committee of nine members, chosen from among the Americans, who appeared to it to be the best qualified to represent the Executive Council in the organization of this congress. Since the formation of this committee one of the members, Dr. Smith, has resigned, and has been replaced by Dr. Walker, president of the Odontological Society of New York.

But, during the session of the F. D. I. at Stockholm, the National Dental Association at the close of its meeting at Niagara Falls appointed a committee of fifteen members to organize the congress, in the event of the invitation being accepted. Accordingly, when the two committees came together, an antagonism arose among them because of the similarity of the mission with which each was charged. Which of the two committees should organize the congress? That is the question.

The bureau of the Federation, consulted in regard to this, and unable, despite its efforts, to re-establish harmony, decided, in the absence of precise texts and sufficient information, not to make an imperative decision in the interval of the two sessions, so as not to involve by this decision the F. D. I. in a way that would not have been that of the majority of the representatives of the several countries.

The Executive Council should examine this question with all the care that it merits, in taking into account the documents that have been addressed to it by the mandatories of the committee of nine and of the committee of fifteen, as well as by the president of the St. Louis exposition and by the director of the congresses, and after having taken cognizance of all the useful information for an ample discussion.

This question appears to us to have considerable interest for the future of the Federation and to be very important on the subject of future organizations of International Dental Congresses.

The final solution will be, we do not doubt, that of justice and truth, as it will be the decision of men who represent analogous but various interests, and who are only anxious about the welfare of the dental profession in general.

The constitution of the bureau of the Executive Council will also be examined with care, for it appears to us to be necessary to change alternatively the rolls of the different members of the council, so that the Federation may be really international and not always directed and governed by men of the same country. After that the study of the F. D. I. budget should be taken up, which will be preceded by the examination of all the expenses which have been necessary since the last session and by those which may be anticipated in order to liquidate this present session at Madrid.

Among these expenses the most important is that for publication of the reports, and the council should make the necessary provision so that this publication takes place as rapidly and economically as possible, by an examination of the proposals that have been presented by the different journals. It should also see that this publication shall appear in languages most spoken.

The laws of the council being made for a year only, there will be an occasion to study the articles that it will be well to modify.

Finally, an agreement should be reached on the choice of the city where the next session of the F. D. I will be held.

Independently of the questions that precede and which form, with the exception of the American question, the annual schedule of the work of the Executive Council; independent, likewise, of the study of a proposition established in a preceding session on the subject of the federation of schools, there will be cause to study two propositions which have been sent to the council for advice and which, moreover, are interesting.

One of them, presented by Dr. Forberg, of Stockholm, discourses on the creation and organization of a universal Dental Review. The author of the proposition states how difficult it is to keep up with the incessant progress of our art in the different countries and how much time is spent looking over the articles in order to find those that are really important. The result of it is that many well-informed authors and excellent writers ignore issues that have already been discussed in foreign journals, from which results the loss of valuable time and often fruitless discussions relative to priority.

We think it will be necessary, in order to arrive at a practical result, to create at this very session a commission of an international dental press, comprising professionals, and ask of this commission to inform us of the ways and means to arrive at the creation of a bulletin which will enable the dentists of all countries to keep posted in all the new matter that interests them.

The other proposition, presented by Dr. Haderup of Copenhagen, has for its object to propagate an international dental nomenclature and stenographic system; and, furthermore, it will be necessary, as the author of the proposition demands elsewhere, to name a committee that will be able, we believe, to attend to jurisprudence and statistics, so that the large army of dentists of the world may know the number of its members in the several countries, their measure of general and special instruction, and be informed in the jurisprudence that concerns them.

But before discussing the formation of new commissions the council should attend to the arrangement of the work of the existing commissions.

The order of the day, which we have published, informs you that the commission of instruction has received from the Executive Council the mission of examining what should be the technical instruction of the dentist. This question has been chosen because we examined in the preceding sessions what should be the preliminary instruction in the study of surgical dentistry and what should be, also, the scientific and medical instruction. Nothing more will remain then than to study the part concerning technical instruction. That will form the chief subject of the discussions of the commission of instruction during the present session.

Finally, the hygienic commission, of which Dr. Frank, of Vienna, brought last year to Stockholm a very important documentary report, should this year come to precise and practical conclusions which will be sent to the several governments in order to justify one of the purposes of this Federation; that is to say, permission to take care of all those who suffer by profiting from the most recent discoveries in the art of modern dentistry.

That is one of the chief rolls of the Federation, which, outside of its special mission, on the subject of preparing international congresses which it is charged to organize, should tend constantly to elevate the standard of the dental profession of the entire world, and to bring to all the unfortunate the benefits of hygiene.

Mr. President and honorable fellow members, I have just shown you in a very epitomized form what were the most salient of the labors anterior to this session and the program for those that should be performed at Madrid. I have shown you, in concluding, that one of the causes of the existence of this Federation, and not one of its least entitled to glory, consists in its seeking to give assistance, from our special standpoint, to all those who suffer, whatever may be their origin or situation in life. It is on this thought of humanity that I wish to conclude this report in thanking the members of this assembly for their kind attention.

CHICAGO DENTAL SOCIETY.

A regular meeting was held June 2, 1903, with the president, Dr. Donald M. Gallie, in the chair.

Dr. L. H. Arnold read a paper on "Dental and Oral Prophylaxis."

DISCUSSION.

Dr. Carl Theodor Gramm:

I think we all agree, as a body of men, who see the influence of unclean mouths and unclean teeth, that the position taken by the essayist is the correct one. If I have any criticism of the paper to make it is that it is elementary; and in consideration of the supposition that this is a scientific body whose time is to be taken up with the profounder problems in dentistry, it seems to me that the presentation of elementary treatises ought to be eliminated, just as the recitation of the multiplication table has no place at a session of astronomical observers. I think that all of us should have known from our earliest experiences, as students and practicing dentists, just what the essayist has written.

Most of us would find it impossible to give each of our patients one-half to an hour a month for a cleaning of their teeth. If the doctor, for instance, has eight hundred patients on his list, it would require four hundred hours per month to serve them properly. In a month of twenty-six days, with seven working hours a day, there are but four hundred and sixty-four half hours. Taking into account the holidays and missed appointments, the doctor could clean the teeth of not more than four hundred patients during the year. He would do no filling, have no time for bridge work—in fact, for ordinary operations. And what of the other four hundred patients, for whom he would have no time? You see the carrying out of the essayist's proposition has impractical sides.

I think the essayist is oversanguine in making the statement that by keeping the teeth thoroughly clean the patient would be immune from tooth disease. He forgets the influence of ill health upon the teeth in general. There are periods of every woman's life and in every child's life when teeth disintegrate more rapidly than they do at other periods. All human beings are subject to disorders; for example, those of the digestive tract, which influence the vulnerability of the tooth to disintegration. The doctor's statement that pyorrhea alveolaris could be prevented by keeping the mouth clean is, in my opinion, unwarranted. He evidently considers pyorrhea a local disturbance, due to uncleanliness. We ought to have learned long ago that pyorrhea is closely associated with, and usually a manifestation of, general disturbances.

On the whole, it may be well to remind us to urge our patients to clean their mouths, particularly those who have been in the habit of neglecting this. Certainly! Are we not supposed to be teachers, instructors? That's what the word "doctor" means, anyway.

Dr. J. W. Dostal:

I think we will all agree with the essayist that perfectly clean teeth in normal surroundings cannot decay. There is more or less indifference manifested by dentists relative to thorough cleansing of the teeth of patients. The late Dr. George H. Cushing wrote an article on this subject, in which he stated that this important part of dentistry was sadly neglected by the members of the dental profession.

As to diet, undoubtedly it plays a very important part in the prevention of decay of the teeth. It is a well-known fact that meat-eating people are seldom troubled with decay of the teeth. Take, for instance, the Laplanders and the Greenlanders, who subsist principally on meat; they rarely have bad teeth, while those who live on soft and predigested foods have teeth which decay more rapidly and frequently than those who subsist on a meat diet.

We are all familiar with the eight cardinal points mentioned by the essayist, but I doubt whether the average dentist gives the time and care that the essayist does in cleansing the teeth.

Dr. C. N. Johnson:

There is one point that I desire to call attention to particularly, and that is this: I have not seen any mouthwash that will prevent dental caries. Even if we place our dependence upon the best mouthwashes for this purpose it will lead to difficulty such as we have experienced in another line in the profession. Just as soon as we attempt to substitute medicines for mechanics we make a mistake. In the treatment of pulp canals, unless we do the mechanical part of the operation properly, I do not believe drugs will remedy our mistake. It is as important to clean a pulp canal mechanically as it is to use drugs, and keeping the mouth in a perfectly hygienic condition, with the full functional activity of mastication, will do more to preserve the mouth in a normal condition than the frequent application of mouthwashes. In our modern civilization we do not get full mastication. The teeth of the people of to-day are not used as fully as they should be, and the problem is presented to us to supplement that by artificial friction along the lines laid down by the essayist. I am in favor of using friction with toothbrush and massage of the gums. In many cases we cannot get our patients to do this; we have to give them lessons how to do it. I believe that we had better rely in the main upon keeping the surfaces of the teeth clean by friction rather than on the use of drugs.

DR. CROUSE:

Would you not use both?

DR. JOHNSON:

I would emphasize the point that the use of mouthwashes will lead to laxity in other measures with the average practitioner. I think Dr. Crouse realizes that as well as anyone. Dentists are looking for easy ways of accomplishing something.

DR. CROUSE:

I have never found one.

DR. JOHNSON:

Neither have I. I believe that the flood of proprietary medicines that have been foisted upon the profession and circulated among the people has done just as much harm as good, and probably more.

DR. D. M. CATTELL:

The first paper that I ever read that amounted to anything before a dental society was one on cleaning teeth. I was an amateur then in that art, and I gave expression to some thoughts that were criticised severely at the time. But I have grown more and more in favor of ideas expressed at that time, until to-day I am more in favor of cleansing the teeth than ever.

I enjoyed very much the paper that has been read this evening, because I believe the author is on the right track. We cannot cleanse the teeth too often or too thoroughly. Many patients will not clean their teeth, others cannot, and we can, if we will but do it. Many of the conditions that we find in the mouth are such that any attempt to cleanse the teeth by the patient is all but impossible. At other times the same individual or individuals may accomplish it. We all know there are times when the fluids of the mouth are so sticky and viscid that it is difficult to clean the tooth surfaces of the gummy adhesions, notwithstanding all the brushing that may be done with a common toothbrush; and I think the very fact of calling patients in once a month, as the essayist has suggested, serves as an education to them, and calls their attention to the matter in such a way as nothing else will. I think the future of dentistry is largely prophylactic, and that if we can do something to preserve the teeth, or rather to prevent their decay, we will have accomplished great results.

In regard to mouthwashes, I do not believe that there is a mouthwash made that is strong enough, antiseptic enough, bactericidal enough, that we can use in a minute or so in washing the mouth, whose influence will remain there for any length of time. The influence of any mouthwash is only momentary, and soon after it is removed from the mouth the same saliva glands, the same mucous follicles excrete the same juices; in fact, the same condition exists, so that the influence of a mouthwash is only temporary and cuts but little figure in influence on fermentation. The point I wish to make is this: that any mouthwash we may use, that is a great bactericidal agent, carries with it such an influence that it operates upon the mucous membrane in such a way as to reduce the normal action of that membrane; and if we persist in using a stronger mouthwash, that has bactericidal influences sufficient to cut any figure for more than a few minutes, its action upon the mucous membrane will be so cell destructive that it will retard the normal action of that membrane so much that the mucus fluid poured out from it, or the lack of fluid, consequent upon the use of the wash, will be felt or noted. The mucous membrane will feel hot or dry, so to speak. I do not believe we have a mouthwash on the market to-day that is of much value in removing fungous growths from the teeth. Those who persist in the use of mouthwashes too much will injure the mucous membrane, or retard it from doing its normal work. I believe the proper way to get at the conditions of the mouth to retard dental caries, so far as the fluids are concerned, is to get action upon the fluids of the body in general. If we can introduce into the general system some agent by inoculation or otherwise, something that will act similar to the vaccine virus in smallpox, we then can have an antitoxin, so to speak, that will change the fluids of the mouth that the individual may become immune from caries. There exists a time in all of our lives when the fluids of the mouth are so bactericidal of themselves that they retard the influence of dental caries. If we could but understand the human physiology so well that we could introduce into the system something that will give us this immunity at our will, then we will have advanced greatly. We do that in cases of smallpox, we do it in rabies and diphtheria. According to a recent article on tetanus, we can inoculate the system and influence the microorganisms of that disease. If we can so change the fluids that enter the mouth and make them sufficiently bactericidal, and prevent the development of the fungus that produces dental caries, we will have accomplished a great result. But so far as our present knowledge goes, we cannot do that, and the only thing we can do is to keep the teeth as clean as possible; and I know of no better way of doing it than to take them in hand often, as the essayist suggested.

DR. GEORGE W. COOK:

The remarks made by Dr. Cattell have prompted me to say a few words on this subject. The paper was interesting, and some interesting points have been brought up in regard to the bactericidal qualities of saliva, the effect of mouthwashes on the teeth, and the effect of mechanics in arresting disease of the oral cavity. This subject has been rehashed many times, but always with more or less interest.

As to the question of keeping the mouth in a perfectly healthy condition, from a bacteriological standpoint, it is one with which we are not familiar. We know that we have one disease of the oral cavity which is practically unaffected by cleansing of the teeth or by instituting any form of treatment, and that is erosion. The question naturally arises whether erosion is due to bacterial action or to a perverted condition of the mucous membrane itself. There is some doubt in the minds of physiologists in regard to this, but there are conditions of the human body in which certain cells of the mucous membrane or of the epithelial structure in general become perverted. In the deciduous teeth the cells surrounding the root of the tooth become changed physiologically; they take on properties that they never possessed before, and consequently the root of the tooth is destroyed. Whether such a condition is brought about in the mucous membrane, where we have erosion, or not, is a question yet to be settled. If that is true in the use of mouthwashes and of various agents for the prevention of dental caries and other oral diseases, it is a question whether we may not convert a normal mucous membrane into an abnormal one, in accordance with the suggestion advanced by Dr. Cattell. If we could secure a perfect physiological mouthwash the suggestion brought out by Dr. Crouse would be a good one; but at the present time we have nothing. There are a number of men who have worked quite intelligently upon this subject to bring about such a condition, and the problem has baffled everyone who has attempted to do anything in this line. For instance, in one case a dentist may have what he considers a perfect mouthwash for a certain individual, but in the next case he finds that the same mouthwash is a detriment to tooth structure or to the mucous membrane. The constitutional conditions that may arise to bring about immunity in certain individuals are beyond the reach of our present-day knowledge. I do not believe there is any mouthwash on the market today that is in any sense perfectly agreeable or suitable to any individual case in all respects. That is a broad statement to make, but I have taken up the subject of mouthwashes systematically. I have examined and studied carefully the various mouthwashes that have come under my observation, and some of the good mouthwashes that are bactericidal are detrimental in other respects; and we have yet to incorporate in a mouthwash or in a tooth paste that which will preserve the oral mucous membrane and tooth structure. Time alone may bring about the result we desire. For the present we have to come down to the simple rules of hygiene that have been laid down by the essayist. If we can keep the tooth surfaces absolutely free of debris and objectionable conditions that are produced by bacterial growth, and keep the mucous membrane of the mouth in a healthy state, we can do a great deal towards preventing any further decay of the teeth. But the oral mucous membrane to-day is not what it will be to-morrow. We may have a simple colloidal substance on the mucous membrane of the mouth, and the moment it comes in contact with a perfectly smooth surface it becomes glued there. How are you going to remove this substance or these substances except by mechanical means? The use of chemical agents for the purpose of dissolving away these gelatinous substances that form on tooth structure is beyond our means at the present time. I do not believe the time will soon come when we can do that. So far as the preservation of the teeth and of the oral mucous membrane is concerned, I believe it can be better accomplished with normal salt solution than with any other agent known to dental science.

Dr. Crouse:

Do you claim that there is any evidence that erosion is produced by any mouthwash or any germicide that has been used in the mouth?

Dr. Cook:

I would not say that is true, but it is probable in some cases. We must expect it to be due to one of two things: either a perverted condition of the oral mucous membrane, or some bactericidal action; and we may produce that perverted condition by the use of some mouthwash. We may use an agent that will convert the normal epithelial structure of the mucous membrane into an abnormal one. If we could cut out slices of tissue and study them in a physiological condition, as to what effect a mouthwash would have on the tissue, we could determine something about it. But we cannot do it. If a particular gland over the surface of a tooth becomes perverted in its physiological activity, it is abnormal either to itself, or to some surrounding structure. I think it is possible for us to produce erosion in another way. We may produce it physiologically through the secretions of the body. For instance, certain glands take upon themselves to secrete certain substances, and these are poured out on the surfaces of the teeth, and thus bring about erosion.

Dr. Gramm:

Is it not quite probable that the perversion of the mucous cell is due to a general physical condition rather than to a local one, because if it were merely a local one it would recover in a short time? The erosion, I take it, is not due to a temporary perversion, but to a chronic perversion; and, if that is true, must we not consider the general physical condition of the patient as well as the matter of local applications to the gums?

Dr. Cook:

The question asked by Dr. Gramm opens up another great problem. We know that in many cases of epithelioma it takes many years for the tumor to develop. We have a perverted cell nutrition there. Malignant tumors sometimes grow very rapidly, and in a short time a large tumor is developed. On the other hand, it may take years for the tumor to develop to any considerable size, and we have a continuation of the epithelial growth, either rapidly or slowly. We know of no constitutional conditions that may bring about a local perversion of these particular cells. A large majority of investigators of this subject explain this by saying it is due to some parasitic condition. It is a parasite found in that particular cell or particular structure, where it is a local condition. If it is a simple perversion of the cell, as is claimed by another class of students on the subject, it may be due to an enzyme; it may be due to some particular physiological substance that acts constantly upon that particular surface for an indefinite period and causes erosion. It is possible that we may have a constitutional condition which is an important factor in the causation of erosion; but there is one proposition which is clearly in the minds of every biological student of to-day, and that is, no disease exists from the cells within the body except it is brought about by some external stimulus. If the perverted condition of the mucous membrane of the mouth is such as to bring about erosion it may be due to the action of bacteria in the intestinal tract. It is a reversible action, so to speak. The whole subject of biology to-day rests upon the question of the location of this disease process, or this disease stimulus, and each individual case will have to be worked out separately. In one instance it may be a local condition; in the other it may be a constitutional one, and that constitutional condition may be due to some external cause.

DR. FLORENCE ATKINSON:

I have been listening this evening for some one to tell us as to the method of instructing patients how to keep their teeth clean. I would like to know if the gentlemen ask their patients how they brush their teeth, and if they have ever had one tell them that they brushed them correctly. Being a woman, when I was in college I decided that my practice would be largely confined to women and children; consequently I made the care and preservation of the teeth a particular study. I invariably ask a new patient, or one who comes under my care for the first time, how she brushes the teeth, and how often she does it. I invariably have patients demonstrate how they brush their teeth. I spend from ten minutes to half an hour sometimes in telling them how to clean their teeth, after having finished cleaning them. I have found but few sets of teeth that I could clean at one sitting properly—where I could carefully and conscientiously say that I had removed all of the tartar from under the free margin of the gum; and sometimes I see my patients two or three, and even four and five, times before I polish the teeth. I have some cases where I find it necessary to clean the teeth once a week, but they are few. Many patients brush their teeth up and down, and do not clean them as thoroughly as they should. They do not pay enough attention to the interproximal spaces. I have experimented with children, with young people, and have taught them how to clean their teeth, and after doing so I have been surprised at the difference in the condition of their mouths when they came to me after the first visit, say from three to six months, or a year afterwards. If a patient has been properly instructed to clean the teeth and how to use the tooth brush I feel that half of the battle has been won. I do not mean to say that I do not prescribe mouthwashes. I do in many cases.

Dr. Carl Theodor Gramm:

I wish before this discussion on prophylaxis is closed to mention the most valuable agent which every dentist should have as part of his armamentarium, namely, floss silk, reinforced with a little cotton twisted upon it. This agent, if placed in the hands of our patients and properly used, will do more than a thousand brushes toward preventing dental decay interproximally.

Dr. C. P. Pruyn:

One of the speakers criticised the paper on the ground of its elementary character. This paper deals with basic principles. The author has tried to teach us or to emphasize those things we are supposed to know, but we need to have them repeated from time to time, and by so doing we always get something good.

Regarding the use of floss silk with cotton added to it, that is a new idea to me. It may be a very valuable thing.

Reference was made in the paper to massage of the gums. I wonder how many of us do that; how many of us recommend it. I wonder how many have observed the results from massage of the gums. Have we observed its effect for any length of time. Perhaps we have not had time to give it sufficient attention to know what the results are. Undoubtedly, valuable results can be obtained from massage of the gums. I do not know positively, and I simply ask these questions for information.

I wish to ask another question. Has anyone ever seen marked deleterious effects from the use of pumice stone used upon the brush as a powder alone? We have heard it said over and over again that the coarse powders are deleterious. We know that our fathers years ago used to recommend pumice stone as a powder, and gave it out by the handful to patients, and recommended its use. Does it produce erosion to any extent? If so, we ought to know it. If it does not, we ought to have the truth brought out in regard to it. My advice to patients is to use pumice stone occasionally when deposits occur on the teeth. I have been using it for twenty-five or thirty years every few weeks, if I was not able to remove the debris by means of an ordinary tooth powder or brush, and I do not know that I have seen any injury from its use.

Dr. Hugo Franz:

So far as the use of pumice stone is concerned, I think if we will watch our cases carefully in which pumice stone has been used we will find that it has very much the same effect sometimes that we see following the use of floss silk. I have had a couple of cases where I was very sorry I had advised the patients to use floss silk, and for a year or two I did not have a chance to see them. I did not pay enough attention to the patients to see how the floss silk was acting. It is true some gums can stand any amount of irritation by the use of floss silk snapping down from the contact point of the teeth and impinging on the gums. It takes a great deal of time to instruct a patient how to use floss silk. If it is used with considerable force it may set up irritation of the gums. In a mouth where the gums are easily irritated by any mechanical interference with them it is beyond the possibility of a patient to use floss silk, and as long as we see it does harm we should discourage its use. The same thing will probably be found to be true in using pumice stone. We should watch patients carefully who use it to see what effect it will have, and as soon as we see that the enamel gets dull, loses its lustre that it ought to have, we should discourage the use of pumice stone in those cases. There are lots of cases in which pumice stone can be used almost daily, and it may not have any effect on the enamel, but in other cases the enamel will be affected by its use.

The point I want to make is, that whenever we give advice to use certain substances habitually for cleaning the teeth we ought to have the persistency to notice what effect their use has on the teeth of different patients, and as soon as we see things are going wrong we should discourage patients from using those agents which we have advised them to employ.

My experience with floss silk has been that after its use many patients will come back with the gums swollen and red, with pockets forming. I have had that experience in four cases.

Dr. A. J. Oakley:

I have one question to ask, in addition to those propounded by Dr. Pruyn, namely, How many dentists care for their own teeth as they should, and how many of you practice what you preach?

Dr. F. W. Stephan:

I do not wish to discuss the paper of Dr. Arnold, but the question was brought up as to bad results from the use of pumice stone. I have never seen a well-marked case, but I remember my father being called from the office to pick pumice stone from the gums of a sick patient. She had evidently used pumice stone and had probably not rinsed her mouth well after its use, consequently it lodged around the gums, and it required the use of instruments to remove it piece by piece. It took two or three sittings to do it. That is the only case I know of.

Dr. Arnold (closing the discussion):

If I did not consider this the most important subject in the whole range of dentistry I would not spend much time in closing this discussion. The prevention of caries is the most important subject that dentists have to deal with.

Dr. Gramm objected to the time it takes to prevent caries. If one does not take time to do the work well he may just as well not attempt it. I cannot clean some sets of teeth in half an hour; it takes an hour or an hour and a half for me to do it, and patients are willing to pay for it when they understand its importance. He spoke of the teeth of women during pregnancy being in a bad condition, saying that there was a thickening of the saliva, and that the teeth more readily decay. At this time the dentist should go over the teeth of these women very carefully, clean them thoroughly, and endeavor to prevent decay. They are in such a nervous condition that they are physically incapable of having the teeth filled perfectly. If necessary, fifteen-minute sittings can be given, repeating sittings often for such women. They should be thoroughly cleaned, no matter how many sittings it takes to do it.

As to the prevention of pyorrhea, I regard both pyorrhea and caries as local diseases due to local causes, and removal of the local causes removes the disease.

Dr. Dostal referred to diet. I do not think many of us will undertake to diet patients to prevent caries, and most of them will not take dietic treatment. However, I do not wish to disparage that phase of the subject, because I think it is an excellent field for investigation. By removing local causes we will do more than by trying to alter a patient's diet.

As to immunity, the best way to secure immunity is to prevent the first step of decay, and the first step of decay is roughening of the teeth. Pumice stone keeps the enamel thoroughly polished, and if the teeth are thoroughly polished the first step of decay is prevented and following steps cannot obtain.

Dr. Johnson spoke of the importance of mechanics as against medicinal agents in these cases. I think he has exactly the right idea. I cannot understand why any dentist thinks that a mouthwash will remove tartar from the teeth, nor those sticky deposits. There is no mouthwash with which I am familiar that will take the place of careful instrumentation of the teeth for removing tartar above and below the gums. Medicine will seldom, if ever, go below the gums.

Dr. Cattell referred to sticky, ropy saliva as causing materials to stick to the teeth to such an extent that it can only be removed by hard friction and the use of pumice stone, and by that means we incidentally create a healthy stimulus of the gums, so that there is perhaps a more copious outpouring of saliva. This friction stirs up the stagnant glands and produces a more healthy flow of saliva, less ropy and sticky than that produced minus the friction.

As to mouthwashes having a degenerating effect on the mucous membrane of the mouth, I read a paper touching on that subject last year, which did not create as much interest as I think it should have done. The position I took then is the same as now, namely, we all know there is a certain bactericidal property in saliva. I believe it is known as sulphocyanide of potassium. It is a poison to all things living. By supplying saliva with antiseptics artificially by medicines, tooth pastes, mouthwashes, or whatever may be used, the medicine takes the place of the natural bactericide in the saliva and that bactericidal element in the saliva will not be present because there is no call for it; consequently we vitiate the natural fluids of the mouth by flooding the oral cavity with patent medicines.

Dr. Cook discussed the subject of erosion, but I will skip it because it is practically covered in what I have previously said; it is a local condition, amenable to local treatment.

There is one more thing I want to say about the "physiological" mouthwash, and it is this: Binding a person's arm to one position causes loss of its physiological properties; it becomes useless; cannot be straightened. Now, using a mouthwash to take the place of the natural bactericide in the saliva is like binding up the arm; it produces uselessness in the saliva, as binding produced uselessness in the arm.

As to the remarks of Dr. Atkinson, there are a great many dentists who teach their patients how to clean the teeth. I went into the subject of the method of instruction in brushing teeth rather exhaustively in the paper I previously mentioned, which was published in The Dental Review not long ago.

The combination of floss silk and cotton is new to me. As to snapping the floss silk between the points of contact of the teeth and thereby producing injury to the gums, in advising patients to use floss silk we should teach them how to use it. Very little, or no, injury will be produced if the patient uses judgment and follows instructions.

As to the use of pumice, I have used it since I was a child, and I offer myself as a subject, if anybody wants to examine the results from it. It is much softer than the enamel and used on the tooth brush for the short time that a patient uses the brush I fail to see—even theoretically—how any injury can be produced.

It simply supplements the expectation of natural wear on the enamel, and is beneficial, when intelligently used, rather than injurious.

Dr. Albert E. Morey read a paper on "Medication and Over-Medication in the Practice of Dentistry."

DISCUSSION.

Dr. Arthur D. Black:

I think Dr. Morey has given us a very clear statement of the misuse we may make of drugs in our practice, and I believe most of us will agree with him that these mistakes ought not to be made.

Some time ago I read in a book by an old physician, whose name I cannot now recall, two rules which he said should always govern a physician in the use of drugs. The first was that one should never use any drug unless there was a positive indication for its use. Second, that as soon as the indication ceased to exist, one should cease to administer the drug. According to those rules, we should always have a positive indication for the use of every drug we employ. It seems to me the most important point in the use of medicines in dentistry is to make a proper diagnosis of the case in hand. I believe we, as dentists, do not pay enough attention to diagnosis and to the study of our cases, with a view to making a proper diagnosis. Our dental schools do not teach enough of physical diagnosis. We should have a brief course, at least, in physical diagnosis, so that students may have an opportunity of going over and marking out the outlines of the chest, studying heart sounds, etc. They should receive instruction in percussion and palpitation, not so much for the occasional times they may have to use these measures on the chest, but for the additional experience they will have in the use of those methods in conditions presented by patients at the office. I think, too, that dental students ought to receive more instruction in regard to the use of the fever thermometer, and more study should be given to the condition of the pulse. It is a rare thing for the average dentist to pay very much attention to the temperature and pulse of patients. A study of these things, together with a study of the patient himself, will afford us valuable information. A correct diagnosis will simplify our medication, and if we expect to be successful as practitioners of dentistry, we must be able to make accurate diagnosis of all kinds of cases that present.

As an illustration of this, I am reminded of a case that occurred quite recently, in which there was pus discharging about an upper first molar. The dentist, who had been treating the case for several months, and had called it pyorrhea, had been scaling the lingual root of the tooth, and applying medicines about the root. Finally, he gave the case up, because it was not progressing well, and sent the patient to another dentist. On examination, the other dentist found that the scaler would pass up the lingual root and over the apex of it. The first dentist had not discovered that the pulp was dead in that tooth. After the removal of the pulp, with amputation of the lingual root, the tooth was cured in a short time. In this case, one dentist could have done the work just as well as the other, but the first dentist failed to make a proper diagnosis. These matters are important to us in holding the patients we get.

There is one point in connection with medication that was not mentioned by the essayist, and that is: we should always be on the lookout for people who are susceptible to certain drugs. This would apply particularly to cocaine. I have a patient who, if she takes only three drops of oil of cassia in a half glass of water, and simply rinses her mouth with it, within twenty-four hours a rash will break out all over her body. She is peculiarly susceptible to the oil of cassia. This is one of many patients we may find who are susceptible to this or that drug. I think the warning Dr. Ridlon used to give us quite often at the medical school is a good one, that is, not to give patients too much medicine—give the patient a chance.

Dr. W. H. G. Logan:

In reference to the treatment of putrescent root canals, we treat them too much with medicine and do not pay enough attention to the mechanical part of the work. Very frequently a filling is inserted with strong drugs beneath, and the action of the drug or drugs is more direful than the putrescent condition we are trying to control.

In reference to over-medication in the treatment of pyorrhea, you cannot over-medicate the part, for the reason that the saliva carries the medicine away as fast as you put it in there. If you wish to rely upon any drug for action in a pus pocket, or on the side of the root, let the drug be in the form of a powder, not in a solution. Incorporate whatever drug you wish to use in some powder, pack it in the part, and you will get a result. If you wish to use a solution, let it be put in with glycerine, which will keep it in contact because of its consistency.

Another thing in connection with medication that is now being brought out is the use of electricity, and if you wish to do your full duty, you will look into it. In cases of spongy gums, you can, by the use of either the positive or negative wire of a high frequency current, increase or decrease the amount of blood in the part. You can stimulate the cells to more normal function with the aid of electricity, and I believe that in the future, when we wish to control quickly and permanently diseased structures about the roots of teeth, it will not be with solutions, but by electricity.

Dr. Truman W. Brophy:

I wish to compliment the author on his first utterances. It is a subject that should be considered more than it is by members of the dental profession. If we desire to keep pace with the advancement in therapeutics, we must certainly keep in close touch with the literature.

The use of the electric rays in the treatment of inflammatory conditions has passed the experimental stage, and is here to stay. I believe, as I have for a number of years, that by the use of electric rays in the hands of men who understand electricity, that the diseases which have heretofore proven incurable will be amenable to successful treatment.

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EDITORIAL.

THE DENTAL REVIEW FOR 1904.

The past year has been an especially successful one for THE DENTAL REVIEW, and it has never in its history been on a better footing than it is to-day. The department of original communications and society proceedings has in the past twelve months been particularly varied and interesting, so much so in fact that it has at times crowded the editorial department into the closest possible limit. An editor hesitates to place much of his own production before his readers when he has such an ample fund of original matter from other writers to offer them. But it is hoped that in the future a little more space may be made for the editorial treatment of current topics.

A great many requests have come in from time to time to have the "Editor's Desk" appear more regularly, and with a wider range of subjects. It must not be forgotten that the prime purpose of publishing the journal is to deal with strictly dental topics, and this purpose cannot for a moment be overlooked, and yet these requests are naturally very gratifying to the editor, and he promises to comply with them so far as the limits of space will permit. After all, it cannot be denied that even the most practical dentist wants something occasionally in his literature aside from the abstract consideration of strictly professional topics, and when readers ask for this an editor should surely acquiesce.

The fact that THE DENTAL REVIEW does not reproduce articles from other journals makes its contents always of especial interest to readers, and it is probably this which accounts in large measure for its success. During the coming year we hope to present a wide and varied program which will appeal to all classes of subscribers. We have already on hand much matter of very great interest, and we shall endeavor to keep the journal thoroughly up to date in every way. It is a publication which no man practicing dentistry can afford to do without, and unless we make each issue worth more than the entire year's subscription, we shall fall short of what we aim to do for the coming year.

We extend our thanks to those who have aided us in the past with their contributions and their subscriptions, and we promise that with their continued support we shall make The Dental Review better than ever before.

THE EDITOR'S DESK.

Yule Tide.

It matters not how many years a man has lived, there is something wrong in his make-up if he is not touched to tenderness by the annual recurrence of the blessed Yuletide season. Pity the one who finds nothing in it to waken memories of other days, when the world was not so complicated as it is to-day, when simpler wants and simpler joys held sway and filled the hearts of men.

And this leads to a reflection on some of the modern-day tendencies at Christmas time—the mad scramble for giving and taking expensive presents on the part of those who are not bound by the ties of family, just because it has become the fashion—the rage. There is nothing more unseemly, grotesque or burdensome than this perversion of what was once a sweet and simple sentiment.

Let this be the fireside season, when the family gathers about the hearth, and the grandfather and grandmother mingle their whitened locks with the golden curls of their children's children, when the merry laugh of childhood rings through the house and the wee ones celebrate at the shrine of dear old "Santy;" when the strenuousness of life is for the time deposed and hearts are linked closer and closer in a bond of common brotherhood.

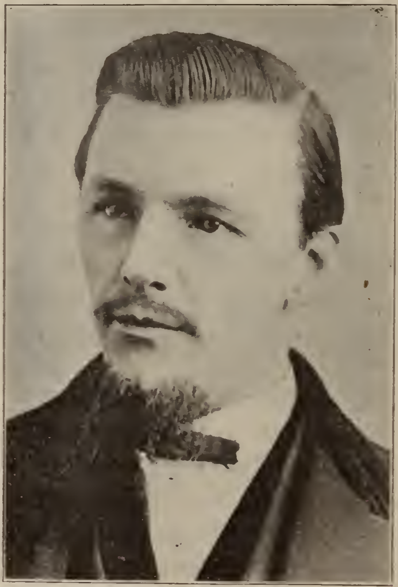
Let this be, above all, the children's hour, when age meets youth and bends the knee to the gentle tyranny of the tots, when the wide world is put behind and the greed of gold forgotten.

Commercialism and Christmas should have nothing in common, and yet commerce has forced its hydra-head into the sacred precincts of the holiday time, and made a travesty of the real happiness that should be. It has gone so far in the mad rush of present-making and present-taking that misery and deprivation follow in its wake instead of good cheer and lightness of heart. How many legitimate and necessary bills are left unpaid to subsequently harrass the debtor on account of squeezing the purse to make costly presents in the effort to vie with others in a similar effort? It has almost degenerated into a vulgar game of donation strife. Out upon all this artificiality, and let us go back to the simple mementoes of other days, the small trifles that cost little but carry with them a heart-beat from the loving breast of nature.

Let us be children for the while, content with childish fancies, and let us no longer pervert the beautiful sentiment which should surround the birthday of the sublimest, simplest man who ever came to earth.

DEATH OF DR. FLAGG.

We have received word—too late for extended notice in this issue—of the death of Dr. J. Foster Flagg, of Swarthmore, Pa. Dr. Flagg was for many years one of the most prominent men in the profession, and we shall give in our January number an account of his life.



R. W. Varney

BIOGRAPHICAL SKETCH.

XXII.

ROYAL WILLIAM VARNEY, M.D., M.D.S., A DISTINGUISHED OPERATOR.

By Burton Lee Thorpe, D.D.S., St. Louis, Mo.

In Brecksville Township, Cuyahoga County (near the village of Independence), Ohio, October 8, 1839, Royal William Varney first saw the light of day. His father was Captain William Varney of New England Quaker stock, and his mother Harty Hathaway of Puritan ancestry, a direct descendant of John Alden.

The Varney family moved to Newburg, Ohio, where young Royal received a common school education. As a boy he was quick, impulsive, and an unusually bright scholar, excelling in arithmetic, algebra and geometry. He was extremely modest, and "bashful" to a painful degree. This he had, in later life, a hard struggle to overcome.

His strong and genial character made him a general favorite at school; his intimates were boys older than himself. Being attracted to dentistry, at the age of seventeen he became acquainted with the family's dentist, a Dr. Duman, of Cleveland, with whom he studied with little success. After a short tuition he returned home, where he tried to practice for friends and relatives. While thus engaged, he made his own plugger points, saying "there were no good instruments on the market." He also went to the office of his friend, Dr. A. B. Halliwell, of Cleveland, whom he assisted at odd times. This unsatisfactory practice he continued for three years, until in 1859 he went to Cleveland, Ohio, and applied to Drs. Wm. H. Atkinson and Chas. R. Butler for instruction. He said to Dr. Atkinson, "If what I have been practicing is all of dentistry, then I am going to give it up. If you can teach me anything, then I want to learn." The doctor describes him as a rough diamond, rather uncouth and harsh in his manner. This, however, soon wore off. He arranged with Dr. Atkinson for much needed instruction. Varney proved to be an apt and earnest scholar, and early in his pupilage manifested a desire for a medical education. He took a special course of lectures in anatomy and soon became very skillful as a dissector, eventually becoming assistant to the Professor of Surgery in the Cleveland Medical College. During his pupilage with Dr. Atkinson he applied for, and obtained from the Dean of the Cleveland Medical College, permission to put two winters' study in one at that institution. After a winter of arduous work he received the degree of Doctor of Medicine in 1863. His desire to acquire a medical education was prompted by a restless patriotic desire on his part to engage in the civil war contest then going on. His hard study caused a serious illness from which he never fully recovered, but, believing that he was needed at the front, he volunteered. He accepted the position of Assistant Surgeon in the Thirty-first Ohio Volunteer Infantry, under the command of General Wm. T. Sherman, of the Army of Tennessee. After serving two years, upon his discharge from the army in 1865, he went to Warren, Ohio, where he spent some months under the instruction of Dr. Corydon Palmer, and then returned to New York to complete his term of pupilage with Dr. Wm. H. Atkinson, with whom he had moved to that city before entering the army and for whom he had a great admiration. Dr. Atkinson considered Varney his especial favorite, and always spoke in the highest terms of him. Atkinson, in his enthusiasm, would say, "Give me Delos Palmer for completeness of finish; Royal Varney for persistency, and Charlie Butler for uniformity, and I will beat the world in filling teeth."

Soon after completing this course, he became associated with the late Dr. George E. Hawes, of Bond Street, who became greatly fascinated with Dr. Varney, and arranged with him to practice in partnership for four years. His success with Dr. Hawes was unparalleled, greatly to the gratification of the doctor. He then started for himself, in 36th Street, near 5th Avenue. Here he continued for four years until his health failed him in 1871.

He systematically made his appointments one hour and a half each, charging per each appointment a fee of $18. This he persistently carried out. He quickly gathered a large following; many patients that he had when with Dr. Hawes became very fond of him and placed great confidence in his ability. He was soon able to purchase the house in which he commenced practice and during the first year he paid on it $11,000 cash.

He developed marvelous skill as an operator. He had few equals in filling teeth and no superiors. His especial forte was the manipulation of heavy gold foil with which he built magnificent contoured monuments to his skill.

He was a natural mechanic and designed a set of instruments for packing gold, the Varney pluggers, which the profession readily accepted when they were first put on the market. They are appreciated and in demand to this day. He early became interested in microscopical work, and was an enthusiastic investigator and an active member of the American Microscopical Society. His practice seemed to occupy most of his time, for his writings were few. They were on "Preparation of Cavities," "Epulis," "On Heavy Foil," "Root-fillings." In societies he was not always at ease; he had a horror of controversers, and sometimes handled them rather pugnaciously; but while he was persistent and self-willed, he had a very kind heart.

He was a member of the Dental Society of the State of New York, which conferred upon him the degree of Master of Dental Surgery, June 29, 1871. He was also a member of the First District Dental Society of New York, the Society of Dental Surgeons of New York, and the New York Odontological Society. He was clinical lecturer to the classes of the New York Dental College, his demonstrations being very instructive and highly appreciated by his students.

He was married to Miss Joan S. Thomas of New York City, August 14, 1866, who survived him at his death. They had no children. Being naturally delicate, his rough army experience left him in a weakened condition from which he never fully recovered. In 1869 his health began to fail, pulmonary symptoms developing. His delight in nature was almost unprecedented and he obtained much relief in getting away from his work and living, at intervals, in the woods. In the autumn of 1871, finding his health failing rapidly, by direction of his physicians, he went to Florida, accompanied by his wife. On his way to Atlanta he stopped at Savannah, where he died of tuberculosis, April 12, 1872, and was buried in Greenwood Cemetery, New York.

His early professional friend, Dr. Charles R. Butler, says of him: "He was a warm and true friend; enthusiastic, yet modest, inflexible in his integrity; he had a host of friends, by whom he will long be affectionately remembered."

He had a taste for music and was no mean performer on the violin. The matchless operations from his skillful hand, before the advent of the dental engine, did much to demonstrate the real possibilities of operative dentistry and raise the ideal of our profession. He once remarked that his ambition was, if cut short in his work at any moment, the last filling he put in should be his best—the one he would be content to be judged by.

He was a natural mechanic and idealist, whose brain was so educated to appreciate the beautiful and fingers so attuned to perform the most difficult feats, that this marriage of hand and brain resulted in harmonious and wonderful effects. His work placed him in the same class as such masterful manipulators of gold foil as Webb, Allport, Atkinson, McKellops and Corydon Palmer.

The facts contained in this sketch were obtained from:
Dr. Varney's widow, Mrs. Joan S. Pollard, Brooklyn, N. Y.
Dr. Varney's sister, Mrs. C. B. Lockwood, of Cleveland, Ohio.
Dr. Chas. R. Butler, Cleveland, Ohio.
Dr. Thomas Rowe, Cobourg, Canada.
Dr. Delos Palmer, New York City.
Dr. G. Alden Mills, New York City, and
from a "biographical sketch of Royal William Varney, M.D.," by Dr. Charles McManus, Hartford, Conn.

DOMESTIC CORRESPONDENCE.

NEW YORK LETTER.

The First District Dental Society of New York opened Tuesday evening, November 10th, by calling for "Incidents of Office Practice."

Dr. Dailey presented a case of impacted upper third molar, which had so worn its way into the posterior portion of the second molar below the gum margin as to expose and cause the death of the pulp. On extracting the second molar the third molar gradually worked forward and downward until now, some three years after, it is nearly in the position the second molar once occupied.

Dr. Dailey showed the extracted second molar, and delineated upon the board the steps of progression. The patient was fifty years of age.

A case in practice where the patient had six lower incisors was described.

Resolutions regarding the death of Dr. F. M. Odell, presented by the committee, Dr. Meyer L. Rhein, chairman, accepted, ordered printed and copy sent family.

The essayist of the evening was Dr. David Genese, of Baltimore, Md., who interested the society with a description and practical demonstration of his method of treating fractures of the maxilla.

The title of his subject was "A New Appliance for the Treatment of Fractured Maxilla, and an Improvement in Plaster Work."

He described how fractures are reduced by passing gilling twine between the teeth and drawing the parts together, then the chin piece, and bandaging. The chin piece is formed by placing plaster of Paris between folds of stockinette, then adjusting and shaping to the parts. Dr. Genese uses no water in mixing plaster, either for such work as described or general laboratory work, but gluten of rice or a boiled down preparation which resembles that product.

It is claimed that gluten of rice takes up about three times the quantity of plaster that water does, makes a harder mass, and shrinks little, if any. When used in vulcanite work, this plaster does not deteriorate like water mixed plaster.

Dr. Genese also showed how to make a wonderfully rigid interdental splint by using soft steel polishing strips which have previously been tinned, bending and burnishing them to fit the buccal and labial aspects of the model, superposing one over another, then soft soldering them together. Holes are then drilled, gilling twine passed through and around the teeth, a split shot passed on twine and tightly against splint, then compressed with pliers, which secures the parts perfectly; the tieing of knots subsequently simply secures the shot in place.

Another material Dr. Genese showed was his separating fluid, which is made of solidified glycerine, alcohol and water. It certainly showed excellent results on plaster to which it had been applied.

The Doctor claims that if one wishes to cast dies and counters directly into plaster impressions mixed with gluten of rice, all that is necessary is to add a small per cent of Kaolin (say about 10 per cent) and it will stand almost any heat.

The regular November meeting of the Institute of Stomatology occurring on election night, it was postponed until Friday evening, November 6th, when a goodly number met for dinner at 6:30 at the Chelsea, in West 23d Street.

At 8 o'clock the meeting convened, President J. Morgan Howe in the chair.

After some details of business looking to the closing of the year and election of officers in December, the essayist of the evening, Dr. D. Braden Kyle, of Philadelphia, presented a paper on "Sialo-semeiology—Treated from the Practical Standpoint Medically, and Not Technically, Giving Facts and Deductions."

His work in the direction of examination of the saliva from a chemic standpoint was marvelous.

Dr. Edward C. Kirk, of Philadelphia, followed, opening the discussion and Dr. Robert Milliken, of Pittsburg, gave the result of his treatment of some eighteen cases based upon an analysis of the saliva, along the lines laid down by Dr. Kyle.

It was remarkable to see the striking coincidence in final result between Dr. Kyle's study of the saliva from a chemic standpoint, and Dr. Kirk's examination of it with the polariscope.

When compared with analyses of the urine, if your correspondent caught the idea, the examination of the saliva was more satisfactory, some cases being cited where *negative* results were obtained from urine, and *positive* indications from saliva.

Dr. Milliken's clinical experience was very satisfactory. He treated many cases of hay fever and asthma, basing treatment on examination of saliva, and finding very often that *benzolate of soda* was indicated, and getting good results therefrom. The full report of this meeting will well repay perusal when it is published.

As the meeting adjourned Dr. Kirk took occasion to call attention to the fact that on Feb. 27, 1904, will occur the fiftieth (50th) anniversary of the graduation from the *old* Philadelphia Dental School, of Drs. Louis Jack, C. N. Pierce, W. Stover How and James Trueman. He said it would be fittingly observed at that time.

The Second District Dental Society (Brooklyn) held its November meeting at the rooms of Kings County Medical Society, Library building, President Hamlet in the chair.

Under "Incidents of Office Practice" a rather heated discussion resulted in regard to the use of "Mummifying Paste." Some were very ardent in its favor, while others were as bitterly opposed.

The attendance was excellent. This society is largely composed of young men and their interest in the work is very gratifying. At this meeting, as at the preceding one, *native* talent was utilized instead of calling upon outsiders.

Dr. Hutchinson, who has been a "bicycle fiend," showed a quick method of repairing the bellows for the Jenkins outfit when the tube connecting with pipe should give way, by using a bicycle tire valve, which clamps or screws down upon both sides of the rubber and so holds connecting tube firmly and without leakage.

Dr. Van Woert showed a mouth mirror, directly the reverse of those in ordinary use, so the mouth need not be stretched so greatly when examining the posterior teeth.

After the regular order of business and Incidents of Practice, a paper was read on "Open Faced Crowns," by Dr. F. C. Royce, in which the Doctor condemned unmercifully that style of crown.

Dr. Schwidt, of Brooklyn, was one of the few who had even a few good words to say for the window crown. He contended that if the edges of the window are stiffened with solder, then plated, it will do excellent service, and look well.

Several who discussed the subject were in favor where it was necessary to bridge near the front of the mouth of devitalizing the pulp, reaming out canal, cementing a tube in same, then constructing an appliance with a post projecting therein, which does away entirely with any crown.

I believe this is known as Dr. Peso's method.

Another little paper, entitled "Hygenic Bridge for Lower Jaw, with Method of Construction"—by Dr. H. Brand—occupied some time. There was nothing new elicited about this subject, but it provoked much discussion pro and con, and served its purpose on that account. Dr. W. B. Dills, who opened discussion of this paper, created some little stir by showing his method of bridging which incorporated an open-faced crown.

The use of Dr. Evans' gutta percha cement in setting open-faced crowns might assist materially in prolonging the life of bridges with such crowns.

The Central Dental Association of Northern New Jersey met and heard read an essay by Ellison Hillyer, D.D.S., of Brooklyn, N. Y., on "Some Problems of Bridge Work," Monday, November 16th, at the dining parlors of Achtel-setter, on Broad Street, Newark.

The meeting was preceded by a dinner, as usual, at which there was quite an unusual attendance. That over, the assemblage adjourned to another room, the meeting was opened, and in order to expedite matters, the regular order of business was suspended and the essayist called upon.

Dr. Hillyer's paper was a conservative resumé of the dental bridge subject, pointing out the pit-falls and the sheet-anchors, alluding to various systems, and concluded by remarking that bridge work must be beautiful, but that strength must not be sacrificed for beauty.

Dr. Brewster, of Brooklyn, in discussing the paper, took exception to Dr. Hillyer's statement that open-faced crowns were pitfalls and that in preference to inserting them, the tooth for such a crown should be devitalized and another method resorted to.

Dr. Littig, of New York, said that he thought most any system adaptable to the case in hand could be made to do the service of the average length of crowns or bridges—viz., about 10 years. He said gold crowns and bridges were excellent institutions for old people.

Dr. Sanger of New Jersey and Dr. LeRoy of New York sung the praises of removable bridge work, contending that it could be used in the majority of cases, and had the advantage of being very conservative practice, as well as very good, where devitalization of pulps became necessary. Dr. Sanger spoke in favor of pressure anæsthesia, and Dr. Wm. Fish, of the use of chloride of ethyl, and cited a case where he had used that method for removal of pulps from six anterior teeth, all at one sitting, and the patient declared it was painless.

Dr. Fish brought out one very good point—the lack of knowledge of the ordinary rules of applied mechanics in the general construction of dental bridges.

Dr. Richards dropped a little hint as to how to make it possible to remove bridges. Paint the inside of all caps and crowns with chloro-percha.

The New York Odontological Society held its November meeting on the 17th, at the Academy of Medicine. After the formal opening by President Dr. Hodson, Dr. Nash stated the St. Louis Congress membership business, inviting all to join at $10 per membership.

Dr. I. N. Broomell, of Philadelphia, was the essayist of the evening, having for his subject, "A Review of Some Early Teachings Regarding the Teeth."

The Doctor evidently has made quite exhaustive researches of the subject, starting back in ancient history, from which he has recorded many quotations in reference to the teeth. Coming down to more modern times, "Columbus states positively that one of his children had three rows of teeth." Another writer says that two rows of teeth were present at one time in one mouth, perfectly regular.

Descriptive of the small knowledge had of the teeth, Dr. Broomell said that as late as 1820 Fitch said that he was ignorant as to the development of the teeth.

Bergereau in his description of the eruption of them, enumerates 4 sets. At the 6th year the anterior set, 12th year another, 15th year another, and then the wisdom set.

Hunter described the pulp as "blood vessels and possibly nerves in a pulpal mass unlike the marrow of bone." Of histology he knew nothing.

Of course, such an essay would not permit of discussion and could only be amended or enlarged upon by those who felt they could add anything to the subject.

Dr. W. W. Walker recalled a tomb-stone he saw this summer while abroad over the grave of Catherine of Tiberius, one of the wives of Henry VIII of England, which bore a chiseled swollen face of that lady, and it is recorded that she died of blood poisoning resulting from a tooth.

Drs. Hart and Starr thought the society were indebted to Dr. Broomell at least in gratitude for his work.

Dr. Broomell was voted the unanimous thanks of the society for his very interesting paper. Yours truly,

THE BOROUGHS.

PRACTICAL HINTS DEPARTMENT.

EDITED BY G. W. JOHNSON, D. D. S.

[This department is for busy readers. We want short articles containing practical ideas—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address G. W. Johnson, THE DENTAL REVIEW, 55 State Street, Chicago, Ill.]

◆

Extracting Incisors or Cuspids.—To remove incisors or cuspids with little exertion and a minimum amount of pain, rotate with lower root forceps. SYLVESTER MOYER, Galt, Ont.

◆

Zinc Dies.—To save time in making small zinc dies for special purposes the model can be partly contoured with wax, covered with tinfoil, and the mold made immediately.

MARK G. MCELHINNEY, Ottawa, Ont.

◆

To Repair a Hole in a Crown.—A small button of pure or coin gold hammered over a hole in the drawplate, corresponding in size to the hole in the crown, makes a convenient rivet which can be attached with solder, or, if a bridge is involved, can be riveted.

OLIVER MARTIN, Ottawa, Ont.

◆

Making Worn-Out Barbed Broaches Smooth.— Fold a small piece of fine emery paper, bringing the rough surfaces in contact, hold between the thumb and index finger of the left hand and work the broach back and forth between, rotating at the same time.

F. J. T. BORCHERS, Chicago.

Inserting Soft Cement.—When applying very soft cement over a pulp capping smear the tip of the instrument with phosphoric acid before allowing the instrument to come in contact with the mixed cement. This will prevent the adhesion of the cement to the instrument. ABRAHAM M. WAAS, Philadelphia, Pa.

◆

Replacing a Facing.—In replacing a facing it is often impossible to make openings in the backing large enough for a Bryant "nut." In such cases cut the threads on the pins, pinch the ends together on the lingual surface of the backing and pack amalgam around them. It never fails to hold.

A. W. THORNTON, Chatham, Ont.

◆

Restoring a Glazed Surface to Ground Porcelain.—Dissolve a small quantity of borax in distilled water and make a thin paste with Jenkins' low fusing body, the shade of the crown. Spread a thin film over the ground surface and fuse in the furnace. You will find that a beautiful surface has been obtained without injury to the porcelain if the piece is not overheated, which might occur if a high fusing porcelain was used. I have tried this several times with good results. C. J. HADLEY, Chicago.

◆

Preparing Wax for the Laboratory.—Beeswax, resin and plaster of Paris, equal parts, makes a splendid wax for cusp carving. It is also a useful material for holding facings in position on the model in bridge work.

Melt the wax, add resin and while in the melted state add plaster of Paris, stirring until cool. If the result is found unsatisfactory melt again and add one or two of the three as required to produce the desired results. HOMER ALMON.

◆

Applying the Rubber Dam Over Deep Cervical Cavities.—Clean the cavity thoroughly, mix some quick-setting cement and fill, covering all margins. Anæsthetize the gum by use of the hypodermic syringe and by the time this is accomplished the cement is hard. The rubber dam can now be applied and the ease with which the clamp can be adjusted will compensate the operator for the time required in placing the cement. This method really saves time for the operator and renders the operation comparatively painless for the patient. After the rubber dam is adjusted the cement can be easily removed.

N. L. Burke, Benton Harbor, Mich.

◆

Taking Small Impressions in Modeling Compound.—Small impressions, i. e., impressions covering a small area, may be easily and accurately obtained by first taking an approximate impression in dento, perfection or similar compound, cooling it thoroughly and using this as a tray to carry a sufficient amount of freshly softened compound to place. The results of this method are highly satisfactory, giving a perfect and sharply defined impression.

To work this material it may be softened in an alcohol or bunsen flame, holding it by an unsoftened end, and when quite hot dipped for a moment in cold water. This barely chills the surface and it can be readily worked with moistened fingers.

F. W. Stephan, Chicago.

◆

Tipping a Lower Incisor.—The lower left lateral had been filled with gold about twelve months previous. The pulp had died under the filling which had broken off soon after being placed.

Treatment.—Removed remains of the filling, cleansed the canal by means of sulphuric acid method and filled the root with gutta percha. The tooth was then beveled labially and lingually, forming a sharp mesio-distal ridge. A platinum pin was adapted and attached with solder to 24k gold plate which was burnished to fit the tooth closely. An old gold filling was then trimmed to lie fairly close to plate and pin and extend over the edge enough to allow for trimming to shape. When attached with 22k solder, polished and set with cement, it looked like a filling and will be durable.

H. Darling, West Bay City, Mich.

◆

Forcing the Gum from Deep Buccal and Labial Cavities.—When the cavity extends far up under the gum margin the following method renders it a comparatively painless operation: Pass a waxed ligature twice around the tooth containing the cavity.

Insert one edge of a large sized roll of cotton under the ligature and draw the first lap tight. Press the remainder of the roll against the gum over the cavity, tie the second lap of the ligature over the center of the cotton and leave for a day or two. When the patient returns it will generally be found that the gum is entirely pressed back from the cavity. Before removing, dry the cotton well and saturate it with adrenalin chloride to stop hemorrhage. Dry the cotton again and saturate with cocaine for a few minutes. The cotton can now be removed and the gums painted with collodion to prevent weeping. Use a narrow clamp in such cases. J. MILLS, Brantford, Ont.

◆

Filling Children's Teeth.—In those cases where the teeth are small, with a tendency to a constricted arch, there is nothing equal to pink base plate gutta percha for filling badly decayed proximal cavities in deciduous molars. Prepare the cavities as well as possible, dry thoroughly and line with chloro-percha. Then fill with one piece of gutta percha large enough to bridge across and fill both cavities. The force of mastication will constantly wedge the filling against the walls of the cavities, resulting in the development of the alveolar process and jaws so that when the bicuspids are erupted there will be abundance of room for all of the anterior teeth. I have had cases in which the space between the molars was extended from 1/8 to 1/4 of an inch. A piece of German silver wire can be inserted in the filling to protect the tissues in the interproximal space. The filling can be renewed as often as necessary. C. R. TAYLOR, Streator, Ill.

MEMORANDA.

Do not forget the meeting of the Institute of Dental Pedagogics at Buffalo, December 29, 30 and 31. This is an important society, and the coming meeting promises much of practical interest not only to teachers but to practitioners.

ALUMNI CLINIC NORTHWESTERN UNIVERSITY DENTAL SCHOOL.

The annual clinic of the Alumni Association of Northwestern University Dental School will be held January 19, 1904, at the University building, corner Lake and Dearborn Streets, Chicago.

All members of the profession are cordially invited to attend.

E. B. JACOBS, D.D.S., President.
G. B. MACFARLANE, D.D.S., Secretary, 70 State Street.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

The fifty-seventh annual meeting of the Pennsylvania Association of Dental Surgeons was held at the Continental Hotel, Philadelphia, on Tuesday evening, October 10, 1903. After the reading and discussion of papers, the following officers were elected for the ensuing year: President, Wilbur F. Litch; Vice-President, M. I. Schamberg; Secretary, J. Clarence Salvas; Treasurer and Librarian, Wm. H. Trueman.

J. CLARENCE SALVAS, Secretary.

NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

The Southern Branch of the National Dental Association will be held in Washington, D. C., February 23, 24 and 25, 1904.

This will be a most interesting and profitable meeting and an excellent program is being arranged. Washington is an ideal place of meeting as well as a most interesting city.

CARROLL H. FRINK, Cor. Sec.

Fernandina, Fla.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Wisconsin State Board of Dental Examiners for examination of candidates desiring license to practice dentistry in Wisconsin will be held in Milwaukee, at Hotel Pfister, January 25, 1904.

Application must be made to the Secretary fifteen days before examination. Candidate must be a graduate of a reputable dental college, or have been engaged in the reputable practice of dentistry consecutively for four years, or an apprentice to a dentist engaged in the reputable practice of dentistry for five years.

J. J. WRIGHT, D.D.S., Secretary.

1218 Wells Bldg., Milwaukee, Wis.

DEATH OF DR. E. S. WINGREN.

It is with especial regret that we announce the death of this promising young man. He was only 28 years of age, and had been in practice since 1899, having been graduated from the Chicago College of Dental Surgery. His health failed and in May last he went to Arizona, hoping the change might help him, but instead he gradually went down before the grim reaper and passed away on October 17, 1903, at Phœnix. To those who knew him well Dr. Wingren's death came as a sense of serious loss. He was one of the most lovable young men in the profession, and his future looked particularly bright till the fatal malady fixed itself upon him. THE DENTAL REVIEW extends its sympathy to his family and friends.

RECENT PATENTS OF INTEREST TO DENTISTS.

741,890. Dental dam, Henry Craigie, San Francisco, Cal.

742,011. Artificial denture, George J. Davidson, Richmond, Va.

741,687. Tooth regulating apparatus, James N. MacDowell, Chicago, Ill.

741,722. Tooth-brush, Wm. B. Ryder and C. L. Reynolds, Redding, Cal.

742,374. Circuit-controller for surgico-dental engines, Wm. W. Alexander, Kansas City, Mo.

742,572. Artificial tooth, David N. Booth, New York, N. Y.

742,305. Blast-controlling device for dental or other uses, Nathan K. Garhart, Indianapolis, Ind.

742,446. Dental filling tool, Harry P. Kelly, Denver, Col.

742,698. Dental jaw-prop, Edgar L. Mason, deceased, Rockland, Me.; F. L. Mason, administrator.

743,817. Riveting device for dental bridge work, Frank A. Brewer, Jr., and Frank A. Brewer, Sr., Watsonville, Cal.

743,529. Chip-blower and syringe attachment for dental engines, Isidor Lyman, Cleveland, O.

743,582. Tooth brush, Wm. S. Stein, Lincoln, Neb.

Copies of above patents may be obtained for ten cents each by addressing John A. Saul, solicitor of patents, Fendall Bldg., Washington, D. C.

RESOLUTIONS BY THE NEW YORK ODONTOLOGICAL SOCIETY ON THE DEATH OF DR. TAFT.

By the death of Dr. Jonathan Taft, the dental profession loses one of its most representative members, and one of its most earnest workers.

A man of high ideals, as shown by his exemplary career, he carried his principles into his daily work and never faltered in his efforts to elevate and advance the status of dentistry.

Having been connected with dental educational institutions as professor or dean since 1854, he knew the needs and weaknesses of the growing profession of which he was such an able representative, and through his teachings and writings his influence has been felt.

Beloved and respected alike by students and practitioners wherever he was known, he leaves a noble record. The profession to which he has unselfishly devoted so many years of his life is better for his having lived, and now that his work is done, we mourn his loss and tender our sincere sympathy to Dr. Taft's family in their bereavement.

Resolved, That this minute be spread in full upon the records of this society and a copy be sent to Dr. Taft's family and also to the dental journals. (Signed) Wm. Jarvie,
A. L. Northrop,
W. D. Tracy,
Committee.

A GOLDEN ANNIVERSARY CELEBRATION—CLASS OF 1854, PHILADELPHIA COLLEGE OF DENTAL SURGERY

The dental profession of Philadelphia, represented by all of its organizations, will celebrate on February 27, 1904, the fiftieth anniversary of the graduation of the Class of 1854 of the Philadelphia College of Dental Surgery by a complimentary banquet to the surviving members of the class, consisting of Drs. Louis Jack, James Truman, C. Newlin Pierce, and W. Storer How.

All dentists in good standing are invited to participate. The subscription price, including a banquet ticket and one copy of the souvenir historical volume to be published in commemoration of the event, has been fixed at ten dollars. The subscription list will be open until February 10, 1904.

The committee in charge of the celebration consists of the following members: Edwin T. Darby, Edward C. Kirk, R. H. D. Swing, Albert N. Gaylord, Earl C. Rice, I. N. Broomell, J. T. Lippincott, L. Foster Jack, G. L. S. Jameson, J. D. Thomas, Wilbur F. Litch, H. C. Register, Wm. H. Trueman, Robert Huey, Wm. L. J. Griffin, J. Clarence Salvas, D. N. McQuillen.

Applications together with the subscription may be forwarded to the chairman of the Invitation Committee,

Robert Huey, D.D.S.,
330 So. Fifteenth St., Philadelphia.

RESOLUTIONS ON THE DEATH OF DR. ODELL BY THE FIRST DISTRICT DENTAL SOCIETY, S. N. Y.

At a regular meeting of the First District Dental Society of the State of New York, November 10, 1903, the following resolutions were adopted:

WHEREAS, On October 11, 1903, Francis M. Odell, M.D., D.D.S., an honorary member of this society and its secretary for some years in its early days, started on that unknown journey;

Resolved, That we, the members of the First District Dental Society in regular session assembled, testify to the loss we feel in his departure from our midst; to the loss the community has sustained since he has ceased to be able to give them the benefit of his well trained mind and his skillful hand; to his skill which has preserved thousands of human teeth to remain a comfort to his former patients in their old age, which, in itself, is the highest praise we can bestow; that we appreciate the work he has done for this society and the scientific advancement of dentistry during his active career; that the fortitude and patience he displayed during the last ten years of his life, constantly battling with a dread disease which not only prevented his practicing his profession but entailed untold suffering, makes his character stand out in a manner most creditable and worthy of emulation; that we condole with his bereaved family; that a copy of these resolutions be sent to his widow, to the dental journals, and also be inscribed on our official minutes.

S. L. GOLDSMITH,
W. E. HOAG,
M. L. RHEIN,
Committee.

AMERICAN SOCIETY OF ORTHODONTISTS.

Program, third annual meeting, December 31, 1903. Morning Session—1. Dr. Milton T. Watson, Detroit Mich., President's address. 2. Dr. I. N. Broomell, Philadelphia, Pa., Macroscopic Tooth Development. Afternoon session—1. Dr. R. Ottolengui, New York, N. Y., A Study of Occlusal Relations of the Jaws of Cleft Palate Cases. 2. Anna Hopkins, D.D.S., St. Louis, Mo., Some Examples of the Orthodontia of the Old School. 3. Robert Dunn, D.D.S., San Francisco, Cal., subject to be announced. Evening session—1. Mr. Elbert Hubbard, East Aurora, N. Y., The Importance of Specialization.

January 1, 1904. Morning session—1. Dr. N. S. Hoff, Ann Arbor, Mich., How Much Orthodontia Should We Attempt to Teach Students in Dental Colleges? 2. Herbert A. Pullen, D.D.S., Buffalo, N. Y., The Great First Class of Malocclusion. 3. Edward H. Angle, M.D., D.D.S., St. Louis, Mo., Orthodontia in the Universal Exposition Dental Congress.

Afternoon session—1. Dr. M. T. Watson, Detroit, Mich., Dr. Lloyd S. Lourie, Chicago, Ill., Dr. G. F. Mendell, Minneapolis, Minn., Dr. F. M. Casto, Columbus, O., Dr. A. H. Ketcham, Denver, Col., Dr. F. C. Kemple, Erie, Pa., Dr. Norman G. Reoch, Boston, Mass., Dr. D. Willard Flint, Pittsburg, Pa., Dr. S. Merrill Weeks, Philadelphia, Pa., Dr. Robert Dunn, San Francisco, Cal., Dr. Rolof B. Stanley, New York, N. Y., Reports of Cases in Orthodontia, Illustrated by the Stereopticon. 2. Exhibition and Informal Discussion of Anatomical Specimens, Illustration, Models and Appliances Pertaining to Orthodontia. 3. Report of Committee on History and Invention. Evening session—1. Mr. Lucius W. Hitchcock, Director Art Institute, Buffalo, N. Y., Art (illustrated lecture).

January 2, 1904. Morning session—1. Dr. Hart J. Goslee, Chicago, Ill., Dr. Joseph Head, Philadelphia, Pa., Dr. Frederick A. Peeso, Philadelphia, Pa., Artificial Substitutes for Missing Teeth in Orthodontia. 2. Dr. Jose J. Rojo, City of Mexico, Mexico, subject to be announced. Afternoon session—1. Dr. Park F. Lewis, Buffalo, N. Y., The Conformation of the Face in Relation to the Development of the Eye. 2. Dr. Frederick Bogue Noyes, Chicago, Ill., A Study of the Peridental Membrane from the Orthodontist's Standpoint. 3. Dr. Martin Dewey, Keokuk, Ia., A Classification of the Principles and Forces of Retention.

AN ANONYMOUS COMMUNICATION.

Following the appearance of Dr. Weiss' article in our September issue, an anonymous correspondent wrote Dr. Weiss an abusive letter ridiculing his work and criticising his paper. It is never worth while to pay any heed to anonymous writers, but in this instance Dr. Weiss thinks that some of the criticism may have been due to the fact that several mistakes occurred in the article, and although attention was called to them in our October issue we herewith give a detailed correction which it is hoped will make the article perfectly clear.

The fifth and sixth lines from the beginning are transposed.

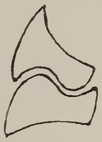
On page 823 near the bottom is another transposition.

On pages 827 and 836 the word "curvative" appears instead of "curvature."

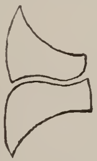
Figs. 18 and 22 are transposed.

On page 830, near the middle, two illustrations were omitted without which the subjoined context is meaningless; they are here reproduced in full.

You can very readily see that cusps ground thus



will be more likely to cause movement or displacement of the plates in mastication than when ground like this:



FOURTH INTERNATIONAL DENTAL CONGRESS.

St. Louis, Mo., August 20 to Sept. 3, 1904. Committee on State and Local Organizations—J. A. Libbey, Chairman, 524 Penn Avenue, Pittsburg, Pa.

The Committee on State and Local Organizations is a committee appointed by the Committee of Organization of the Fourth International Congress with the object of promoting the interests of the Congress in the several States of the Union. Each member of the committee is charged with the duty of receiving applications for membership in the Congress under the rules governing membership as prescribed by the Committee on Membership and approved by the Committee of Organization. These rules provide that *membership in the Congress shall be open to all reputable legally qualified practitioners of dentistry.* Membership in a state or local society is not a necessary qualification for membership in the Congress.

Each state chairman, as named below, is furnished with official application blanks and is authorized to accept the membership fee of ten dollars from all eligible applicants within his state. The state chairman will at once forward the fee and official application with his indorsement to the chairman of the Finance Committee, who will issue the official certificate conferring membership in the Congress. No application from any of the states will be accepted by the chairman of the Finance Committee unless approved by the state chairman, whose indorsement is a certification of eligibility under the membership rules.

A certificate of membership in the Congress will entitle the holder thereof to all the rights and privileges of the Congress, the right of debate, and of voting on all questions which the Congress will be called upon to decide. It will also entitle the member to one copy of the official transactions when published and to participation in all the events for social entertainment which will be officially provided at the time of the Congress.

The attention of all reputable legally qualified practitioners of dentistry is called to the foregoing plan authorized by the Committee of Organization for securing membership in the Congress, and the committee earnestly appeals to each eligible practitioner in the United States who is interested in the success of this great international meeting to make application at once through his state chairman for a membership certificate. By acting promptly in this matter the purpose of the committee to make the Fourth International Dental Congress the largest and most successful meeting of dentists ever held will be realized, and the Congress will thus be placed upon a sound financial basis.

Let everyone make it his individual business to help at least to the extent of enrolling himself as a member and the success of the undertaking will be quickly assured. Apply at once to your state chairman. The state chairmen already appointed are as follows:

General Chairman—J. A. Libbey, 524 Penn Avenue, Pittsburg, Pa.

States—Alabama, H. Clay Hassell, Tuscaloosa. Arkansas, W. H. Buckley, 510½ Main Street, Little Rock. California, H. P. Carlton, Crocker Bldg., San Francisco. Colorado, H. A. Fynn, Denver. Connecticut, Henry McManus, 92 Pratt Street, Hartford. Delaware, C. R. Jeffries, New Century Bldg., Wilmington. District of Columbia, W. N. Cogan, The Sherman, Washington. Florida, W. G. Mason, Tampa. Georgia, H. H. Johnson, Macon. Idaho, J. B. Burns, Payette. Indiana, H. C. Kahlo, 115 E. New York Street, Indianapolis. Iowa, W. R. Clack, Clear Lake. Kansas, G. A. Esterly, Lawrence. Kentucky, H. B. Tileston, 314 Equitable Bldg., Louisville. Louisiana, Jules J. Sarrazin, 108 Bourbon Street, New Orleans. Maryland, W. G. Foster, 813 Eutaw Street, Baltimore. Massachusetts, M. C. Smith, 3 Lee Hall, Lynn. Michigan, G. S. Shattuck, 539 Fourth Avenue, Detroit. Minnesota, C. A. Van Duzee, 51 Germania Bank Bldg., St. Paul. Missouri, J. W. Hull, Altman Bldg., Kansas City. Nebraska, H. A. Shannon, 1136 "O" Street, Lincoln. New Jersey, Alphonso Irwin, 425 Cooper Street, Camden. New York, B. C. Nash, 142 W. 78th Street, New York City. North Carolina, C. L. Alexander, Charlotte. Ohio, Henry Barnes, 1415 New England Bldg., Cleveland. Oklahoma, T. P. Bringhurst, Shawnee. Pennsylvania, H. E. Roberts, 1516 Locust Street, Philadelphia. Rhode Island, D. F. Keefe, 315 Butler Exchange, Providence. South Carolina, J. T. Calvert, Spartanburg. Tennessee, J. P. Gray, Berry Block, Nashville. Texas, J. G. Fife, Dallas. Utah, W. L. Ellerbeck, 21 Hooper Bldg., Salt Lake City. Virginia, F. W. Stiff, Richmond. West Virginia, H. H. Harrison, 1141 Main Street, Wheeling. Wisconsin, A. D. Gropper, 401 East Water Street, Milwaukee. For the Committee of Organization,

EDWARD C. KIRK, Secretary.

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